WADE-8077

Mini-ITX Board

User's Manual

Version 1.3

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Appendix A

Appendix B

How to Use This Manual

The manual describes how to configure your WADE-8077 system to meet various operating requirements. It is divided into five chapters, with each chapter addressing a basic concept and operation of Single Host Board.

Chapter 1 : System Overview. Presents what you have in the box and give you an overview of the product specifications and basic system architecture for this series model of single host board.

Chapter 2 : Hardware Configuration. Shows the definitions and locations of Jumpers and Connectors that you can easily configure your system.

Chapter 3 : System Installation. Describes how to properly mount the CPU, main memory and Compact Flash to get a safe installation and provides a programming guide of Watch Dog Timer function.

Chapter 4 : BIOS Setup Information. Specifies the meaning of each setup parameters, how to get advanced BIOS performance and update new BIOS. In addition, POST checkpoint list will give users some guidelines of trouble-shooting.

Chapter 5 : Troubleshooting. Provides various useful tips to quickly get WADE-8077 running with success. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS setting, and OS diagnostics.

The content of this manual is subject to change without prior notice. These changes will be incorporated in new editions of the document. **Portwell** may make supplement or change in the products described in this document at any time.

Updates to this manual, technical clarification, and answers to frequently asked questions will be shown on the following web site : http://www.portwell.com.tw/.

Chapter 1
System Overview

1.1 Introduction

Powell Inc., a world-leading innovator in the Industrial PC (IPC) market and a member of the Intel® Communications Alliance, has launched its new WADE-8077 series in response to market demand for a simplified embedded system board (ESB) that combines a smaller footprint, lower power consumption, robust computing power and with longevity support.

Built with Intel's latest NM10 chipset, WADE-8077 series take advantage of the Intel® Atom™ D2550 processors.

WADE-8077 has lots of features, also features Two SATA connectors (SATA 3Gb/s) storage specification , one SO-DIMM memory slot for DDR3 SDRAM up to 4GB, support total 6 USB2.0 ports (4x rear IO/2x on board), VGA / HDMI / 18/24bit LVDS ,two Gigabit Ethernet, and supports PCIe 2.0 (one PCI-Express 1slot) devices

WADE-8077's ability to drive two displays simultaneously makes them particularly suitable for lottery and gaming applications. They are also ideal for applications such as point-of-sale (POS), medical, digital signage, kiosks and surveillance security monitoring.

1.2 Check List

The WADE-8077 package should cover the following basic items

- ✓ One WADE-8077 Mini-ITX Main Board
- ✓ One SATA Cable
- ✓ One I/O Shield bracket
- ✓ One Installation Resources CD-Title

If any of these items is damaged or missing, please contact your vendor and keep all packing materials for future replacement and maintenance.

1.3 Product Specification

- Main Processor
  - Intel® Atom™ D2550 dual-core processor
  - CPU clock speed: 1.86GHz
- Chipset

  Intel® NM10 chipset
- System BIOS

  Phoenix BIOS
- Main Memory

  One 204 - pin DDR3 SODIMM socket support up to 4GB 800/1066 MHz memory
- Expansion Interface

  One PCIex1
- SATA Interface

  Two SATA ports(SATA 3Gb)
- Serial Port

  Support Two RS232
- USB Interface

  Support Sex USB (Universal Serial Bus) ports, four on rear I/O and four on board header for internal devices
- Audio Interface

  Connector for Mic-In, Line-In and Line-Out
- Real Time Clock/Calendar (RTC)

  Support Y2K Real Time Clock/Calendar
- Watch Dog Timer
  - Support WDT function through software programming for enable/disable and interval setting
  - General system reset
- On-board Ethernet LAN

  Two Gigabit Ethernet (10/100/1000 Mbits/sec) LAN ports
- High Drive GPIO

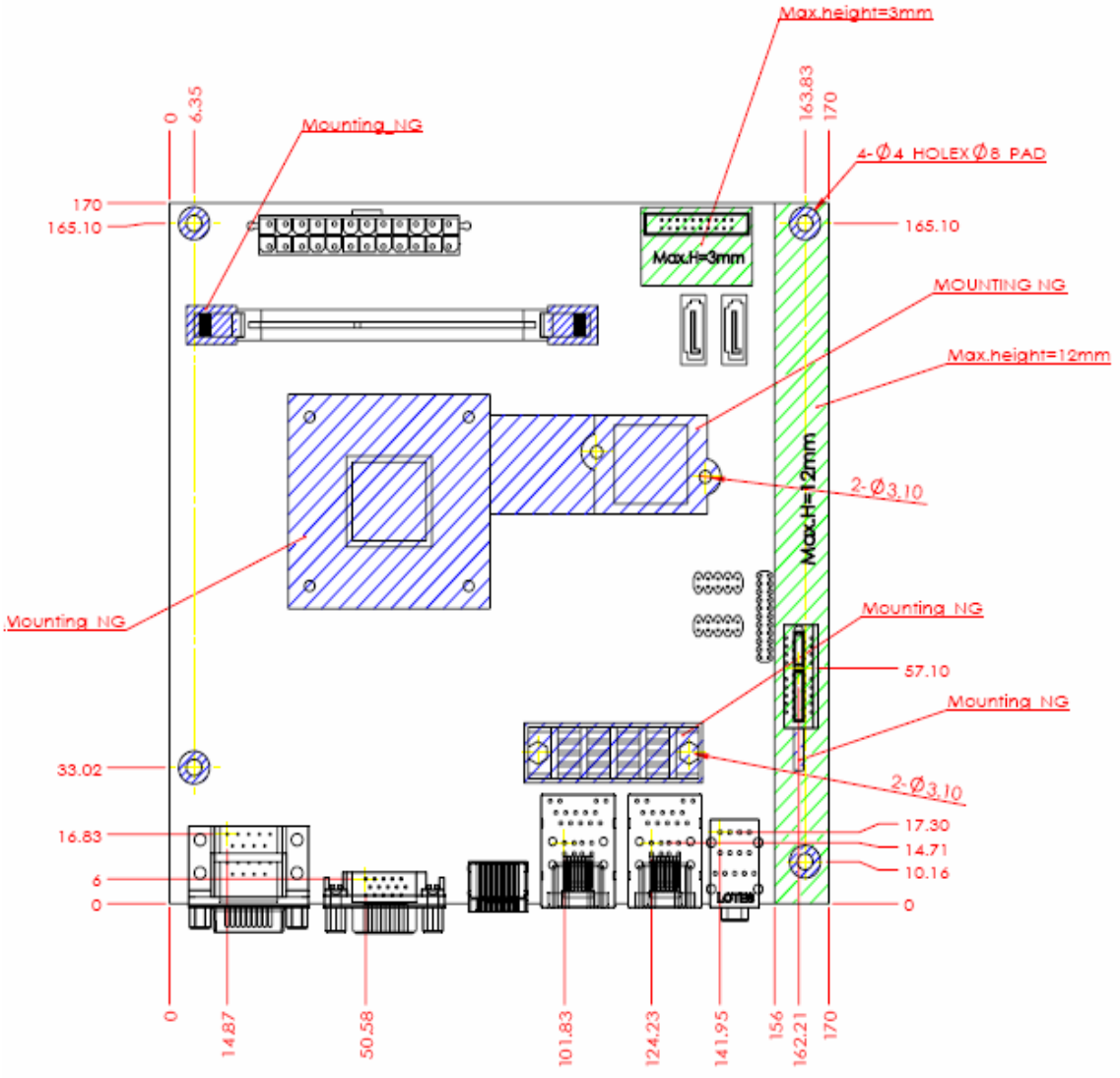
  One pin-header for 8 bit GPIO (4bit in & 4bit out)

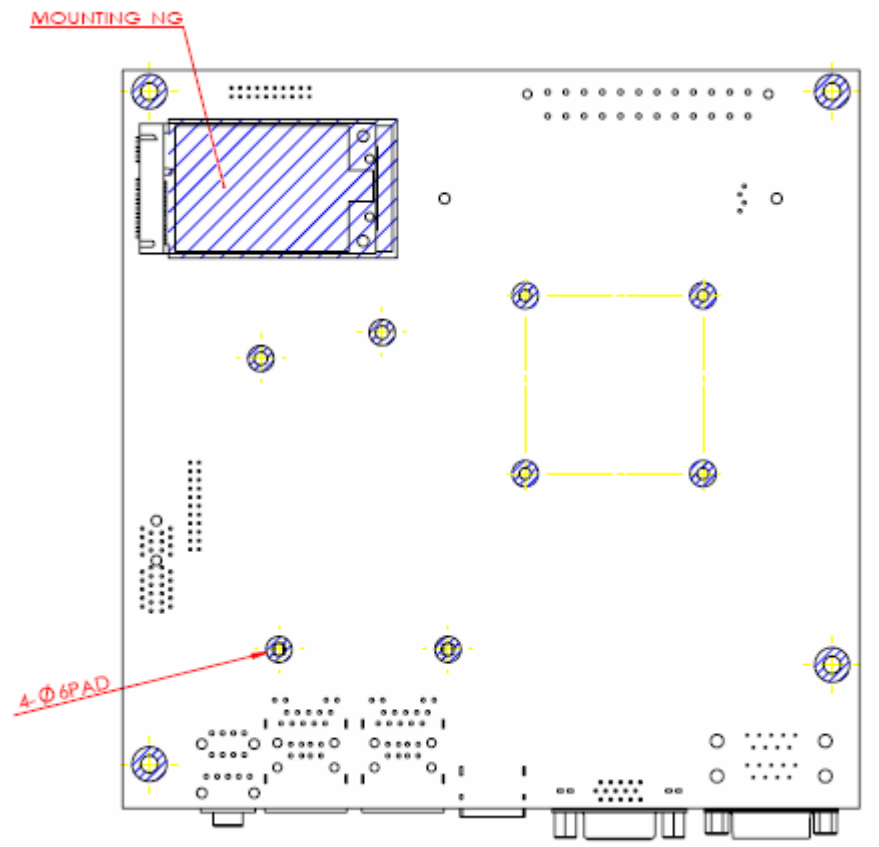
- System Monitoring Feature
  Monitor system temperature and major power sources.
- Outline Dimension (L x W)
  170mm(6.69'') x 170mm(6.69'')
- Power Requirements
- Configuration

CPU Type	Intel® Atom™ CPU D2550 @ 1.86GHz L2:1024 KB
SBC BIOS	Portwell,Inc. WADE-8077 Rev.:R1.00.W4(06282012)
Memory	Transcend DDR3 1066 SODIMM 2GB*1(HCH9 K4B1G0846F)
VGA Card	Onboard Intel® Graphics Media Accelerator 3600 Series
VGA Driver	Intel® Graphics Media Accelerator 3600 Series Version:8.14.8.1082
LAN Card	Onboard Realtek RTL PCIe GBE Family Controller
LAN Driver	Realtek RTL PCIe GBE Family Version:7.50.1123.2011
Audio Card	Onboard Realtek ALC662 High Definition Audio
Audio Driver	Realtek ALC662 High Definition Audio Version:6.0.1.6602
Chip Driver	Intel® Chipset Device Software Version:9.2.2.1034
USB2.0 Driver	Intel® N10/ICH7 Family USB2 Enhanced Host Controller Version:9.1.1.1016
SATA HDD	Seagate ST3180815AS 80GB
CDROM	Pioneer CODE DVD-227A
Power Supply	FSP350-60GLC 350W

- Operating Temperature
  0 °C ~ 60 °C
- Storage temperature
  -20 ~ 80 °C
- Relative Humidity
  0% ~ 90%, non-condensing

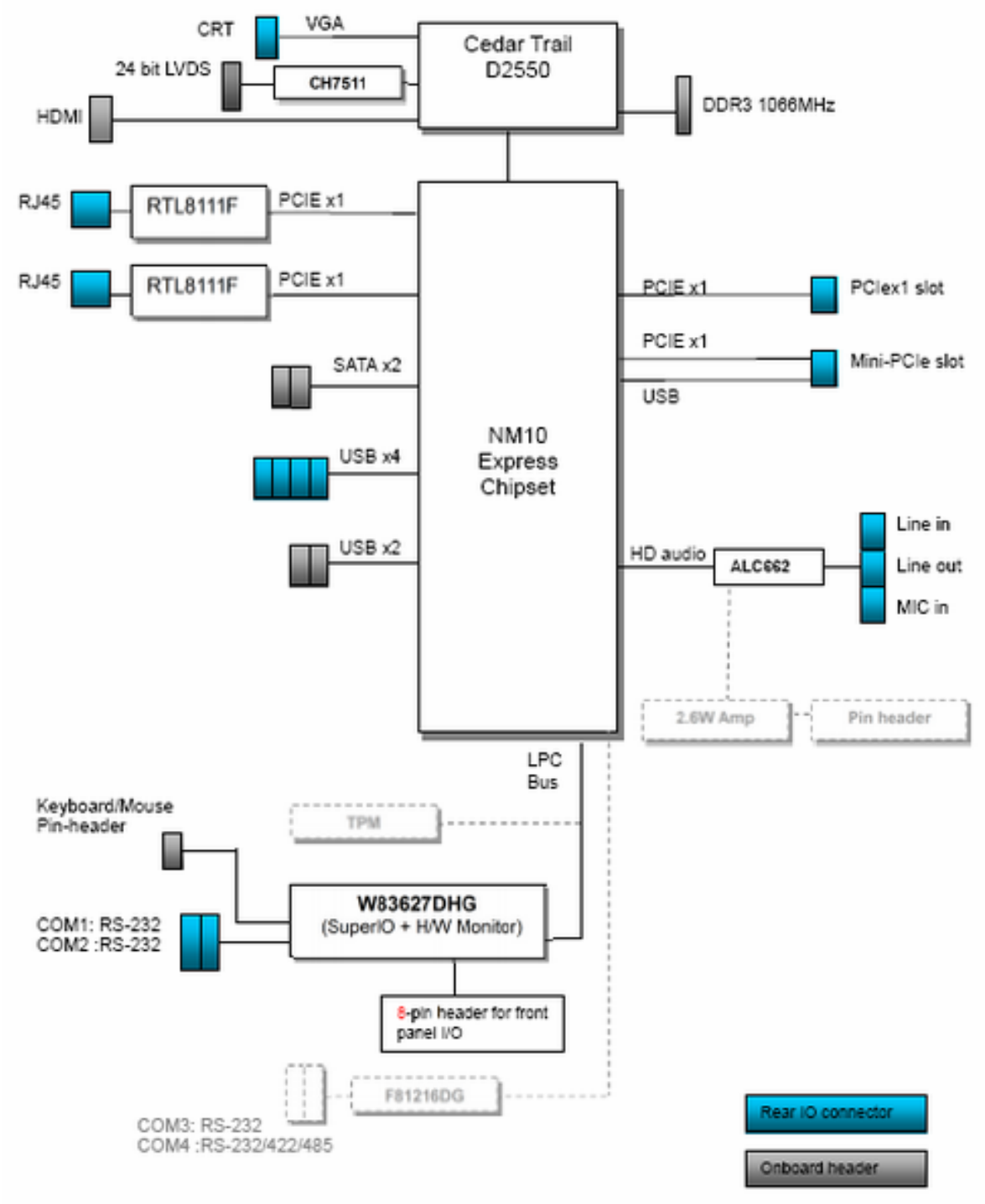
1.3.1 Mechanical Drawing




MOUNTING NG
4-Φ6PAD

1.4 System Architecture

All of details operating relations are shown in WADE-8077 System Block Diagram.

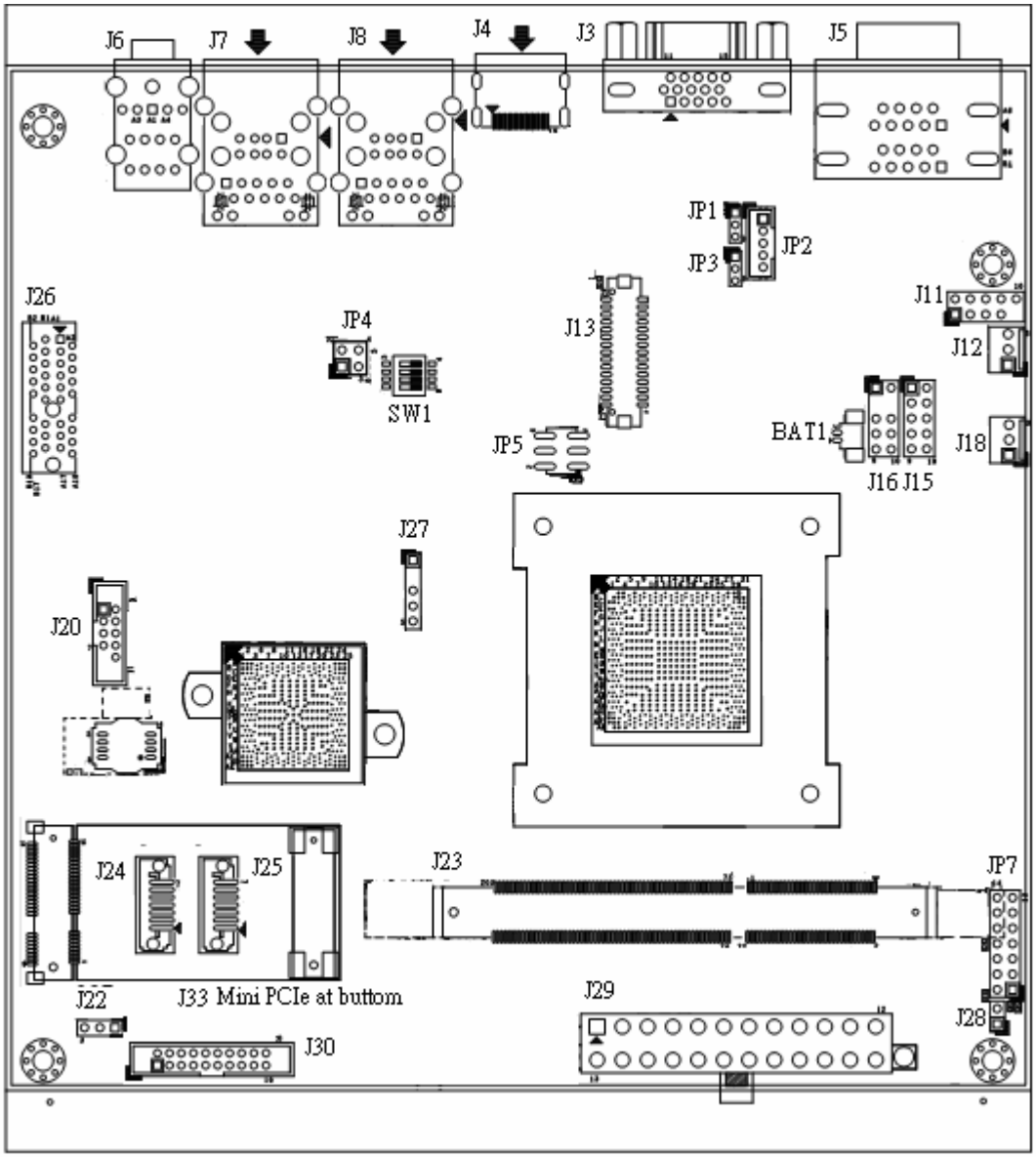


WADE-8077 System Block Diagram

Chapter 2
Hardware Configuration

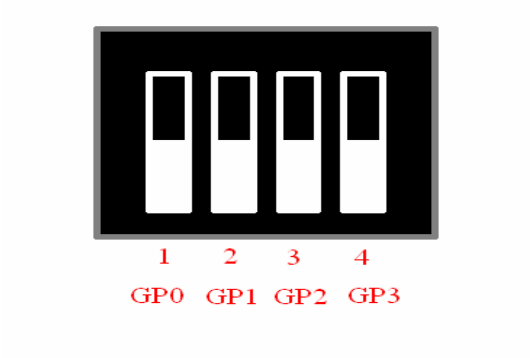
This chapter indicates jumpers', headers' and CONNECTORs' locations. Users may find useful information related to hardware settings in this chapter.

2.1 Jumper Setting



The jumper settings are schematically depicted in this manual as follows:

SW1: LVDS GPIO Switch



ON:0;OFF:1

Default Setting : 0001 (reference to Table 1-1)

PIN NO.				Resolution	Port
4	**3**	**2**	**1**		
ON	**ON**	**ON**	**OFF**	1024 x768 (18bit)	Single

Pin No.	Signal Description
1	GP0
2	GP1
3	GP2
4	GP3

GPIO [3:0]	HA (Pixel)	VA (line)	RR (Hz)	PC (MHz)	CD (bit)	Port	HB (Pixel)	HSO (Pixel)	HSPW (Pixel)	VB (line)	VSO (line)	VSPW (line)
0000	800	600	60	38.25	6	Single	224	32	80	24	3	4
0001	1024	768	60	56.00	6	Single	160	48	32	22	3	4
0010	1024	768	60	56.00	8	Single	160	48	32	22	3	4
0011	1280	768	60	68.25	6	Single	160	48	32	22	3	7
0100	1280	800	60	71.00	6	Single	160	48	32	23	3	6
0101	1280	960	60	85.25	6	Single	160	48	32	28	3	4
0110	1280	1024	60	91.00	8	Dual	160	48	32	30	3	7
0111	1366	768	60	72.75	6	Single	160	48	32	23	3	10
1000	1366	768	60	72.25	8	Single	160	48	32	23	3	10
1001	1440	900	60	106.50	8	Dual	464	80	152	34	3	6
1010	1400	1050	60	101.00	8	Dual	160	48	32	30	3	4
1011	1600	900	60	118.25	8	Dual	512	88	168	26	4	8
1100	1680	1050	60	119.00	8	Dual	160	48	32	30	3	6
1101	1600	1200	60	130.25	8	Dual	160	48	32	35	3	4
1110	1920	1080	60	138.50	8	Dual	160	48	32	31	3	5
1111	1920	1200	60	154.00	8	Dual	160	48	32	35	3	6

Table 1-1: 16 sets of panel timing parameter

J22: CMOS Clear Header

J22	Function
1-2 Short	Normal Operation ★
2-3 Short	Clear CMOS Contents

J28: AUTO POWER BUTTON Header

J28	Function
1-2 Short	AUTO POWER BUTTON

JP1: LVDS Backlight VDD SETTING

JP1	Function
1-2 Short	3.3V ★
2-3 Short	5V

JP5: VDDLVDS_IN Selection

JP5	Function
1-3 Short	3.3V ★
3-5 Short	5V
3-4 Short	+12V

2.2 Connector Allocation

I/O peripheral devices are connected to the interface connectors

Connector Function List

Connector	Function	Remark
JP2	Backlight POWER CONNECTOR	
JP4	LAN1 & LAN2 LINK LED Pin Header	
JP7	Front Panel Pin Header	
J3	VGA & DVI CONNECTOR	
J4	HDMI CONNECTOR	
J5	COM1 & COM2 CONNECTOR	
J6	AUDIO CONNECTOR	
J7	LAN & USBX2 CONNECTOR	
J8	LAN & USBX2 CONNECTOR	
J11	Debug PORT Pin Header	
J12	SYSTEM FAN CONNECTOR	
J13	LVDS CONNECTOR	
J15	8-bit GPIO Pin Header	
J16	KB/MS PS2 Pin Header	
J18	CPU FAN CONNECTOR	
J20	USBx2 Pin Header	
J23	DDR3 SODIMM Socket	
J24	SATA CONNECTOR	
J25	SATA CONNECTOR	
J26	PCI-E X1 SLOT	
J27	SM Bus Pin Header	
J28	AUTO POWER BUTTON Pin Header	

J29	ATX 24P CONNECTOR	
J30	TPM CONNECTOR	
J33	Mini-PCI-E CONNECTOR	
BAT1	BATTERY CONNECTOR	

Pin Assignments of Connectors

JP2: Backlight POWER CONNECTOR

Pin No.	Signal Description
1	+3.3V(Enable pin from JP1)
2	GND
3	+12V
4	Brightness control
5	VCC

JP3: Backlight Pin Header

Pin No.	Signal Description
1	Brightness control
2	GND
3	NC

JP4: LAN1 & LAN2 LINK LED Pin Header

PIN No.	Signal Description	PIN No.	Signal Description
1	LAN1 LED+	2	LAN1 LED-
3	LAN2 LED+	4	LAN2 LED+

JP7: Front Panel Pin Header

PIN No.	Signal Description	PIN No.	Signal Description
1	VCC	2	VCC(power LED)
3	HD_LED#	4	GND
5	GND	6	PWRBTN
7	RESET#	8	GND
9	VCC	10	BUZZER#
11	GND	12	GND
13	VCC	14	NC

J3: VGA CONNECTOR

PIN No.	Signal Description	PIN No.	Signal Description
1	Red	2	Green
3	Blue	4	ID0
5	GND	6	RGND
7	GGND	8	BGND
9	KEY	10	SGND
11	NC	12	SDA
13	H Sync	14	V Sync
15	SCL	16	X

J11: Debug PORT Pin Header

PIN No.	Signal Description	PIN No.	Signal Description
1	LAD0	2	VCC
3	LAD1	4	PLT_RST#
5	LAD2	6	LFRAME#
7	LAD3	8	CLK_PORT_80H
		10	GND

J12: SYSTEM FAN CONNECTOR

PIN No.	Signal Description	PIN No.	Signal Description
1	GND	2	+12V
3	SENSE		

J13: LVDS CONNECTOR

Pin No.	Signal Description	Pin No.	Signal Description
2	VDD_LVDS	1	VDD_LVDS
4	LVDS_N_CH0_TX0	3	LVDS_P_CH0_TX0
6	LVDS_N_CH0_TX1	5	LVDS_P_CH0_TX1
8	LVDS_N_CH0_TX2	7	LVDS_P_CH0_TX2
10	LVDS_N_CH0_TX3	9	LVDS_P_CH0_TX3
12	LVDS_N_CH0_TX_CLK	11	LVDS_P_CH0_TX_CLK
14	LVDS0_DDC_DATA_R	13	LVDS0_DDC_CLK_R
16	GND	15	GND
18	LVDS0_CHB_TX0N	17	LVDS0_CHB_TX0P
20	LVDS0_CHB_TX1N	19	LVDS0_CHB_TX1P
22	LVDS0_CHB_TX2N	21	LVDS0_CHB_TX2P
24	LVDS0_CHB_TX3N	23	LVDS0_CHB_TX3P
26	LVDS0_CHB_CLKN	25	LVDS0_CHB_CLKP
28	NC	27	NC
30	GND	29	GND

J15: GPIO Pin Header

PIN No.	Signal Description	PIN No.	Signal Description
1	GPIO30	2	GPIO34
3	GPIO31	4	GPIO35
5	GPIO32	6	GPIO36
7	GPIO33	8	GPIO37
9	GND	10	5VSB

J16: KB/MS PS2 Pin Header

PIN No.	Signal Description	PIN No.	Signal Description
1	MS_CK	2	KB_DT
3	X	4	X
5	GND	6	GND
7	VKBMS	8	VKBMS
9	MS_DT	10	KB_CK

J18: CPU FAN CONNECTOR

Pin No.	Signal Description
1	GND
2	PWM_CONTROL
3	SENSE

J20: USBx2 Pin Header

PIN No.	Signal Description	PIN No.	Signal Description
1	VCC	2	VCC
3	D4-	4	D5-
5	D4+	6	D5+
7	GND	8	GND
9	GND	10	X

J24: SATA CONNECTOR

PIN No.	Signal Description	PIN No.	Signal Description
1	GND	2	SATA_TXP0
3	SATA_TXN0	4	GND
5	SATA_RXN0	6	SATA_RXP0
7	GND		

J25: SATA CONNECTOR

PIN No.	Signal Description	PIN No.	Signal Description
1	GND	2	SATA_TXP1
3	SATA_TXN1	4	GND
5	SATA_RXN1	6	SATA_RXP1
7	GND		

J27: SM Bus Pin Header

Pin No.	Signal Description
1	SMB_CLK
3	GND
4	SMB_DATA
5	VCC

J30: TPM CONNECTOR

PIN No.	Signal Description	PIN No.	Signal Description
1	CLK_TPM_33M	2	GND
3	LFRAME#	4	X
5	RUF_PLT_RST#	6	5V
7	LAD3	8	LAD2
9	3.3V	10	LAD1
11	LAD0	12	GND
13	SMB_CLK_S	14	SMB_DATA_S
15	3V_DUAL	16	SERIRQ
17	GND	18	X
19	LPCPD	20	X

BAT1: BATTERY CONNECTOR

Pin No.	Signal Description
1	+3.3V
2	GND

Chapter 3
System Installation

This chapter provides you with instructions to set up your system. The additional information is enclosed to help you set up onboard PCI device and handle Watch Dog Timer (WDT) and operation of GPIO in software programming.

3.1 Intel ® Atom TM Processor D2550

Passively-cooled, soldered-down Dual-Core Intel ® Atom™ processor D2550 with Integrated graphics and integrated memory controller

3.2 Main Memory

WADE-8077 provide 1 x 204-pin SO-DIMM sockets which supports 1066 DDR3-SDRAM as main memory, Non-ECC (Error Checking and Correcting), non-register functions. The maximum memory size can be up to 4GB capacity. Memory clock and related settings can be detected by BIOS via SPD interface.

Watch out the contact and lock integrity of memory module with socket, it will impact on the system reliability. Follow normal procedures to install memory module into memory socket. Before locking, make sure that all modules have been fully inserted into the card slots.

Note: DDR3 1333 MHz and DDR3 1600 MHz memory will run at 1066 MHz

3.3 Installing the Single Board Computer

To install your WADE-8077 into standard chassis or proprietary environment, please perform the following:

Step 1 : Check all jumpers setting on proper position
Step 2 : Install and configure CPU and memory module on right position
Step 3 : Place WADE-8077 into the dedicated position in the system
Step 4 : Attach cables to existing peripheral devices and secure it

WARNING
Please ensure that SBC is properly inserted and fixed by mechanism.

Note:
Please refer to section 3.3.1 to 3.3.7 to install INF/VGA/LAN/Audio drivers.

3.3.1 Chipset Component Driver

The Chipset on WADE-8077 is a new chipset that a few old operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows XP / Windows 7, please install its INF before any of other Drivers are installed. You can find very easily this chipset component driver in WADE-8077 CD-title.

3.3.2 Intel Integrated Graphics GMCH Chip

The Intel ® Atom TM Processor D2550 contains an integrated graphics core, the Intel ® GMA 3600 graphics controller, This combination makes WADE-8077 an excellent piece of multimedia hardware, The VGA port supports analog displays. The maximum supported resolution is 1920 x 1200 (WUXGA) at a 60 Hz refresh rate. The VGA port is enabled for POST whenever a monitor is attached

Drivers Support
Please find Springdale GMCH driver in the WADE-8077 CD-title. Drivers support Windows XP, Windows 7.

3.3.3 Intel Gigabit Ethernet Controlle

Drivers Support
Please find Intel RTL8111F LAN driver in /Ethernet directory of WADE-8077 CD-title. The drivers support Windows XP / Windows 7.

LED Indicator (for LAN status)
WADE-8077 provides two LED indicators to report Intel 82566MM Gigabit Ethernet interface status. Please refer to the table below as a quick reference guide.

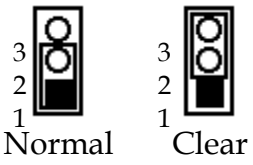
RTL8111F	Color	Name of LED	Operation of Ethernet Port		
			Linked	Active	
Status LED	Orange	LAN Linked & Active LED	On	Blinking	
Speed LED	Orange	LAN speed LED	Giga Mbps	100 Mbps	10 Mbps

3.3.4 Audio Controller

Please find Realtek ALC662 Audio driver form WADE-8077 CD-title. The drivers support Windows XP / Windows 7.

3.4 Clear CMOS Operation

The following table indicates how to enable/disable Clear CMOS Function hardware circuit by putting jumpers at proper position.



CMOS Clear

J22	Function
1-2 Open	Normal Operation ★
2-3 Short	Clear CMOS Contents

3.5 WDT Function

The working algorithm of the WDT function can be simply described as a counting process. The Time-Out Interval can be set through software programming. The availability of the time-out interval settings by software or hardware varies from boards to boards.

WADE-8077 allows users control WDT through dynamic software programming. The WDT starts counting when it is activated. It sends out a signal to system reset or to non-maskable interrupt (NMI), when time-out interval ends. To prevent the time-out interval from running out, a re-trigger signal will need to be sent before the counting reaches its end. This action will restart the counting process. A well-written WDT program should keep the counting process running under normal condition. WDT should never generate a system reset or NMI signal unless the system runs into troubles.

The related Control Registers of WDT are all included in the following sample program that is written in C language. User can fill a non-zero value into the Time-out Value Register to enable/refresh WDT. System will be reset after the Time-out Value to be counted down to zero. Or user can directly fill a zero value into Time-out Value Register to disable WDT immediately. To ensure a successful accessing to the content of desired Control Register, the sequence of following program codes should be step-by-step run again when each register is accessed Additionally, there are maximum 2 seconds of counting tolerance that should be considered into user' application program. For more information about WDT, please refer to Winbond W83627DHG-P data sheet.

There are two PNP I/O port addresses that can be used to configure WDT,
1) 0x2E:EFIR (Extended Function Index Register, for identifying CR index number)
2) 0x2F:EFDR (Extended Function Data Register, for accessing desired CR)

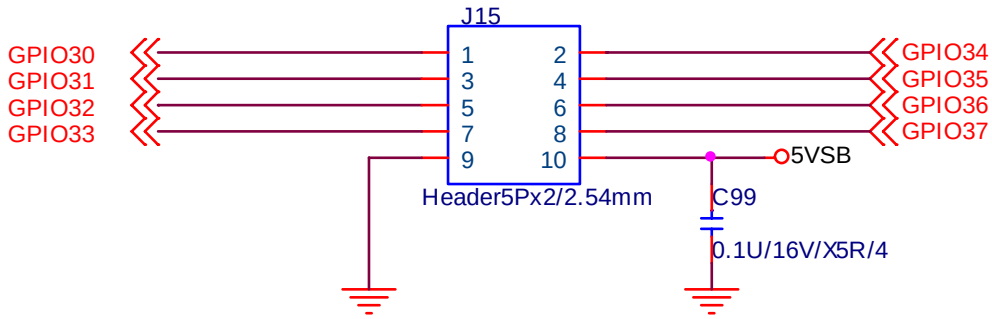
Below are some example codes, which demonstrate the use of WDT.

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
#include <dos.h>

void change_LDN(unsigned char LDN)
{
   outportb(0x2E, 0x07);
   outportb(0x2F, LDN);
}
void set_CFG(unsigned char Add, unsigned char Value)
{
   outportb(0x2E, Add);
   outportb(0x2F, Value);
}

int main(void)
{
   /*Initialze WDT function...*/
   change_LDN(0x08);
   set_CFG(0x30, 0x01);
   set_CFG(0xF5, 0x00);
   set_CFG(0xF7, 0x00);


   printf("Trigger WDT with 5 sec...will reboot in 5 sec.\n");
   printf("Press Enter to disable WDT...\n");
   set_CFG(0xF6, 0x05);
   getchar();
   set_CFG(0xF6, 0x00);

   printf("All test complete. Press Enter to EXIT.");

   getchar();
```

3.6 GPIO

The WADE-8077 provides 8 programmable input or output ports that can be individually configured to perform a simple basic I/O function. Users can configure each individual port to become an input or output port by programming register bit of I/O Selection. To invert port value, the setting of Inversion Register has to be made. Port values can be set to read or write through Data Register.
The GPIO port is located on J15 shown as follows. Please note: DO NOT SHORT-CIRCUIT PIN 9 AND 10 OF J15!

The control for the GPIO signals is hand led through a separate 1-byte I/O space.



3.6.1 Pin assignment

J15: General Purpose I/O Connector

PIN No.	Signal Description
1	General Purpose I/O Port 0 (GPIO30)
2	General Purpose I/O Port 4 (GPIO34)
3	General Purpose I/O Port 1 (GPIO31)
4	General Purpose I/O Port 5 (GPIO35)
5	General Purpose I/O Port 2 (GPIO32)
6	General Purpose I/O Port 6 (GPIO36)
7	General Purpose I/O Port 3 (GPIO33)
8	General Purpose I/O Port 7 (GPIO37)
9	Ground
10	+5V

GPIO Control Command Example (C Language)

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
#include <dos.h>
void enter_SIO()
{
   outportb(0x2E, 0x87);
   outportb(0x2E, 0x87);
}
```

```
void exit_SIO()
{
   outportb(0x2E, 0xAA);
}


void change_LDN(unsigned char LDN)
{
   outportb(0x2E, 0x07);
   outportb(0x2F, LDN);
}

unsigned char get_CFG(unsigned char Add)
{
   outportb(0x2E, Add);
   return inportb(0x2F);
}

void set_CFG(unsigned char Add, unsigned char Value)
{
   outportb(0x2E, Add);
   outportb(0x2F, Value);
}

int main(void)
{
   unsigned char tmpData = 0x0;

   printf("==== WADE-8077 GPIO/WDT test program ====\n");

   enter_SIO(); /*Enter SIO*/
   set_CFG(0x2C, (get_CFG(0x2C) & 0x1F)); /*Clean B[5:7] for set GPIO function*/

   change_LDN(0x09); /*Switch to LDN9 for GPIO3*/
   set_CFG(0x30, (get_CFG(0x30) | 0x02)); /*Enable GPIO3 function*/
   set_CFG(0xF9, 0x00); /*Multifunction to GPIO*/
   set_CFG(0xFE, 0x70);
   sleep(1);

   /*printf("Set GP1~4 to INPUT, GP5~8 to OUTPUT\n");*/
   set_CFG(0xF0, 0xF0);
   /*printf("Set GP5~8 HIGH\n");*/
   set_CFG(0xF1, 0x0F);
   /*printf("Read GP1~4:");*/
   tmpData = get_CFG(0xF1);
```

```
   /*printf("data: 0x%X ", tmpData);*/
   if(tmpData == 0xFF)
      printf("PASS!\n");
   else
      printf("FAIL!\n");

   /*printf("Set GP5~8 LOW\n");*/
   set_CFG(0xF1, 0x00);
   /*printf("Read GP1~4:");*/
   tmpData = get_CFG(0xF1);
   /*printf("data: 0x%X ", tmpData);*/
   if(tmpData == 0x00)
      printf("PASS!\n");
   else
      printf("FAIL!\n");

   /*printf("Set GP1~4 to OUTPUT, GP5~8 to INPUT\n");*/
   set_CFG(0xF0, 0x0F);
   /*printf("Set GP1~4 to HIGH\n");*/
   set_CFG(0xF1, 0xF0);
   /*printf("Read GP5~8:");*/
   tmpData = get_CFG(0xF1);
   /*printf("data: 0x%X ", tmpData);*/
   if(tmpData == 0xFF)
      printf("PASS!\n");
   else
      printf("FAIL!\n");

   /*printf("Set GP1~4 LOW\n");*/
   set_CFG(0xF1, 0x00);
   /*printf("Read GP5~8:");*/
   tmpData = get_CFG(0xF1);
   /*printf("data: 0x%X ", tmpData);*/
   if(tmpData == 0x00)
      printf("PASS!\n");
   else
      printf("FAIL!\n");

getchar();
}
```

Chapter 4
BIOS Setup Information

WADE-8077 is equipped with the Phoenix BIOS stored in Flash ROM. These BIOS has a built-in Setup program that allows users to modify the basic system configuration easily. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When system is turned on, WADE-8077 communicates with peripheral devices and checks its hardware resources against the configuration information stored in the CMOS memory. If any error is detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start-up.

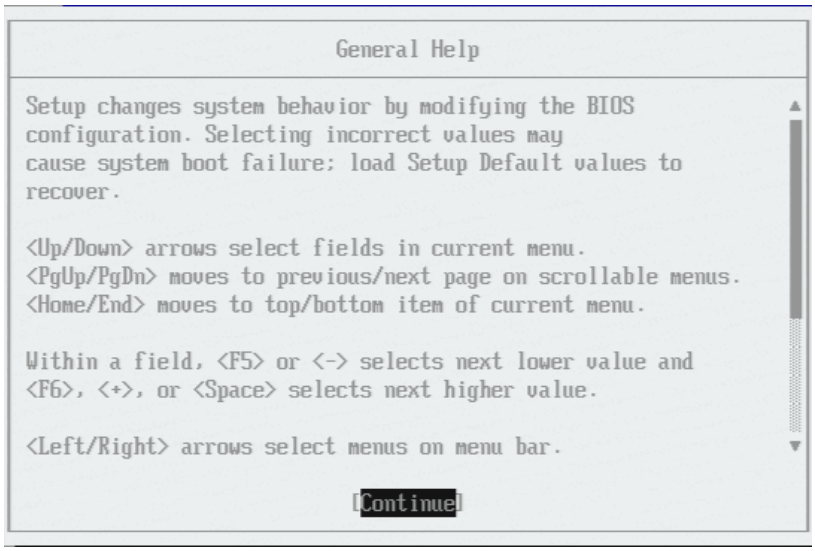
4.1 Entering Setup

Turn on or reboot the computer. When the message “Hit <F2> if you want to run SETUP” appears, press <F2> key immediately to enter BIOS setup program.

If the message disappears before you respond, but you still wish to enter Setup, please restart the system to try “COLD START” again by turning it OFF and then ON, or touch the "RESET" button. You may also restart from “WARM START” by pressing <Ctrl>, <Alt>, and <Delete> keys simultaneously. If you do not press the keys at the right time and the system will not boot, an error message will be displayed and you will again be asked to,

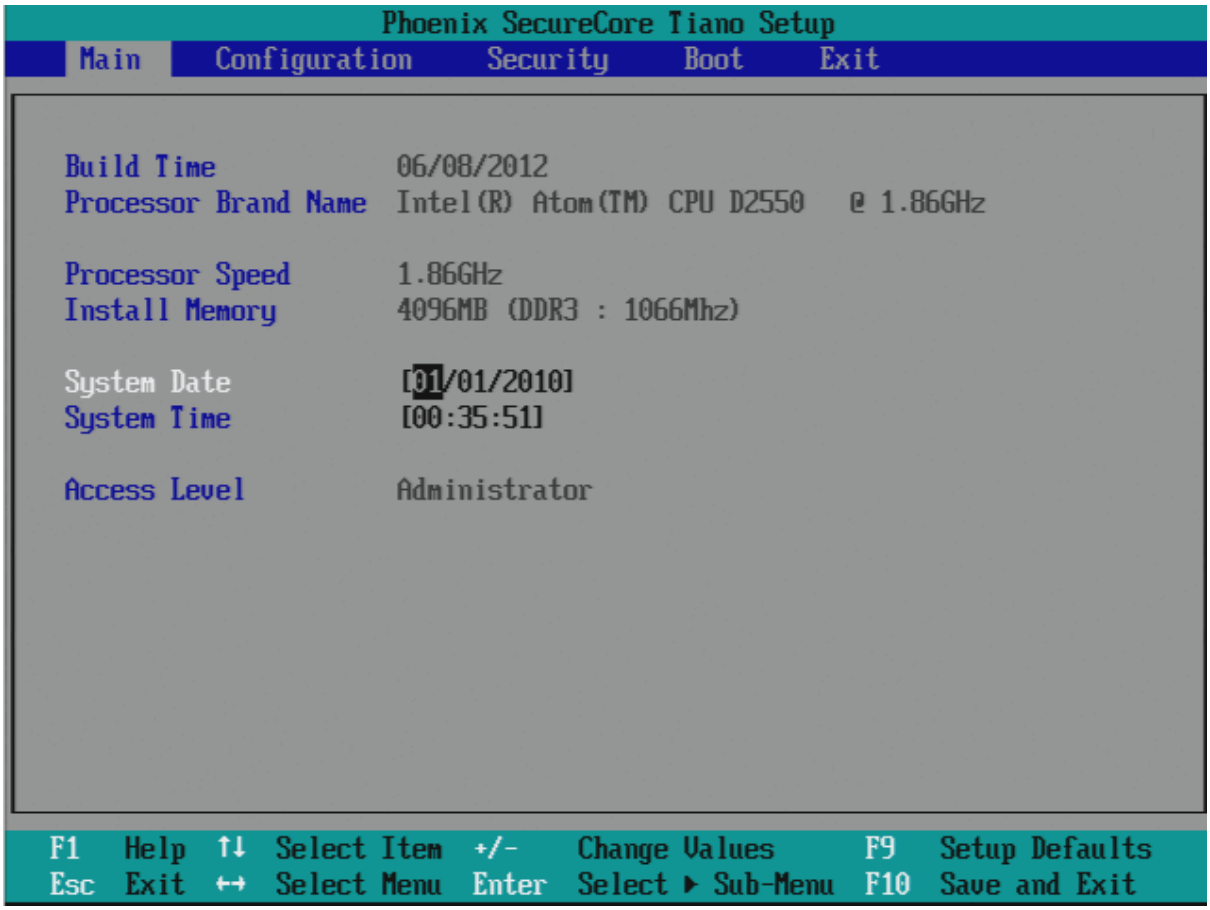
Press <F2> to Run SETUP or Resume

In HIFLEX BIOS setup, you can use the keyboard to choose among options or modify the system parameters to match the options with your system. The table below will show you all of keystroke functions in BIOS setup.



4.2 Main

Once you enter WADE-8077 Phoenix BIOS CMOS Setup Utility, a Main Menu is presented. The Main Menu allows user to select from eleven setup functions and two exit choices. Use arrow keys to switch among items and press <Enter> key to accept or bring up the sub-menu.
This setup page includes all the items in standard compatible BIOS. Use the arrow keys to highlight the item and then use the <PgUp>/<PgDn> or <+>/<-> keys to select the value or number you want in each item and press <Enter> key to certify it.
Follow command keys in CMOS Setup table to change Date, Time, Drive type, and Boot Sector Virus Protection Status.



System Data

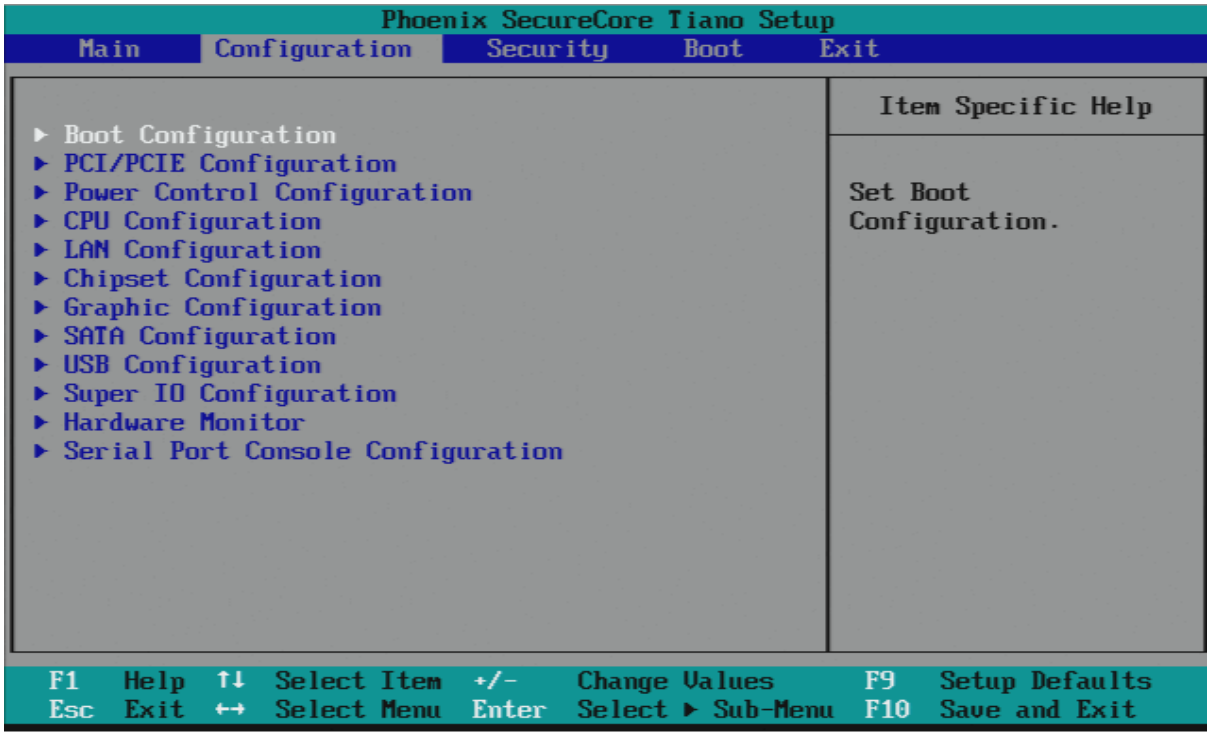
System date in the format [MM/DD/YYYY]. Use <Enter> or <Tab> to switch through the fields. Adjust the
values with <+> and <->.

System Time

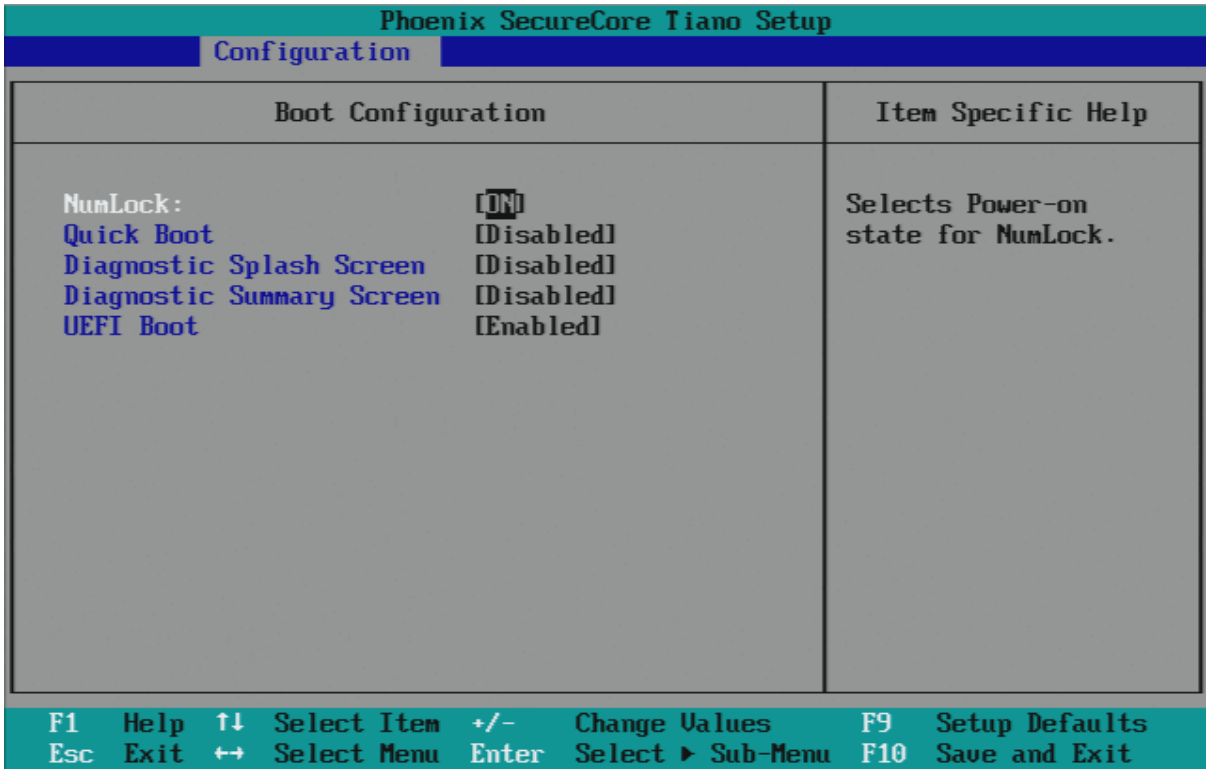
System Time is in 24-Hour format [hh:mm:ss]. Use <Enter> or <Tab> to switch through the fields. Adjust the
values with <+> and <->.

4.3 Advanced

This section allows you to configure your system for basic operation. You have the opportunity to select the system's default speed, boot-up sequence, keyboard operation, shadowing and security.



Boot Configuration


Phoenix SecureCore Tiano Setup
Configuration
Boot Configuration
Item Specific Help
NumLock: [ON]
Quick Boot [Disabled]
Diagnostic Splash Screen [Disabled]
Diagnostic Summary Screen [Disabled]
UEFI Boot [Enabled]
Selects Power-on state for NumLock.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

NumLock

Select the keyboard Numlock state.
Setting to [On] will turn on the Num Lock key when the system is powered on. Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

The choice: ON, OFF.

Quiet Boot

Enables or disables Quiet Boot option.
This BIOS feature determines if the BIOS should hide the normal POST messages with the motherboard or system manufacturer's full-screen logo. When it is enabled, the BIOS will display the full-screen logo during the boot-up sequence, hiding normal POST messages.
When it is disabled, the BIOS will display the normal POST messages, instead of the full-screen logo.

Please note that enabling this BIOS feature often adds 2-3 seconds of delay to the booting sequence. This delay ensures that the logo is displayed for a sufficient amount of time. Therefore, it is recommended that you disabled this BIOS feature for a faster boot-up time.

Choices: Disabled, Enabled.

Diagnostic Splash Screen

This item shows a Diagnostic screen during boot up. This screen is also accessible through the App Menu.

The choice: Enabled, Disabled.

Diagnostic Summary Screen

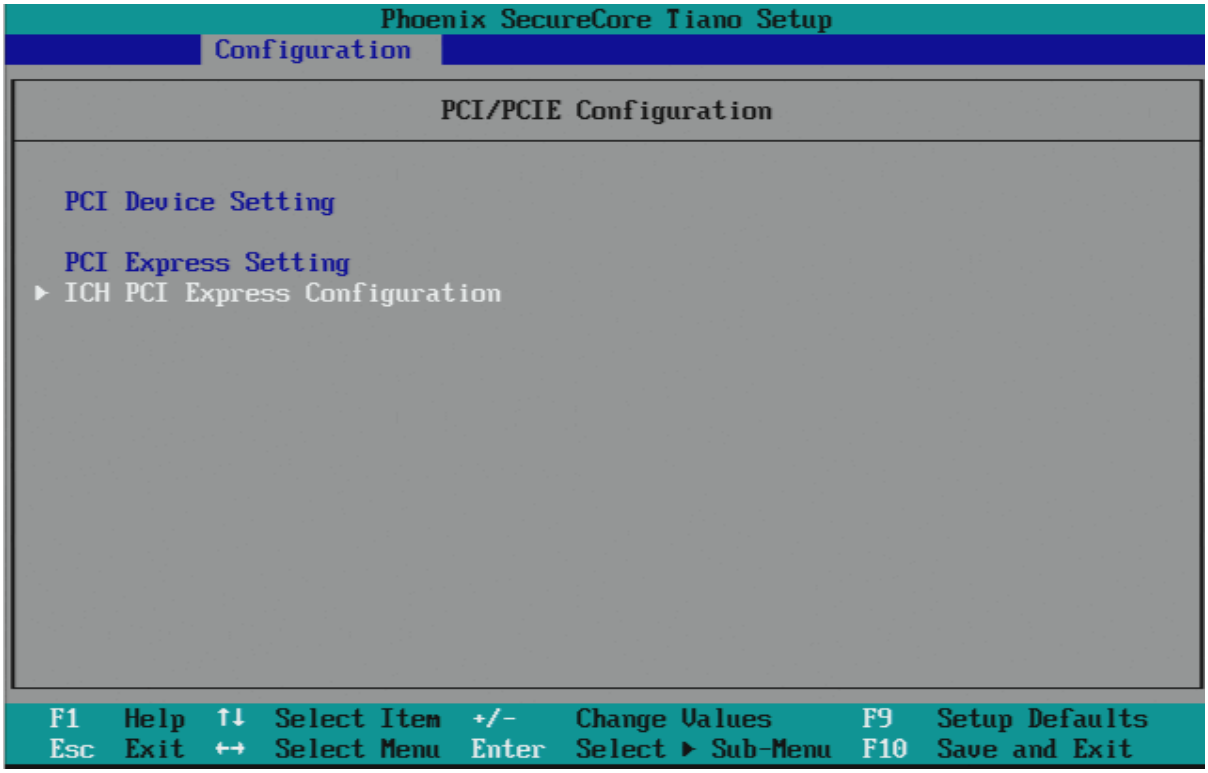
This item shows a Diagnostic Summary Screen during boot up. The boot process will stop by displaying this screen until a key is pressed.
The choice: Enabled, Disabled.

UEFI Boot

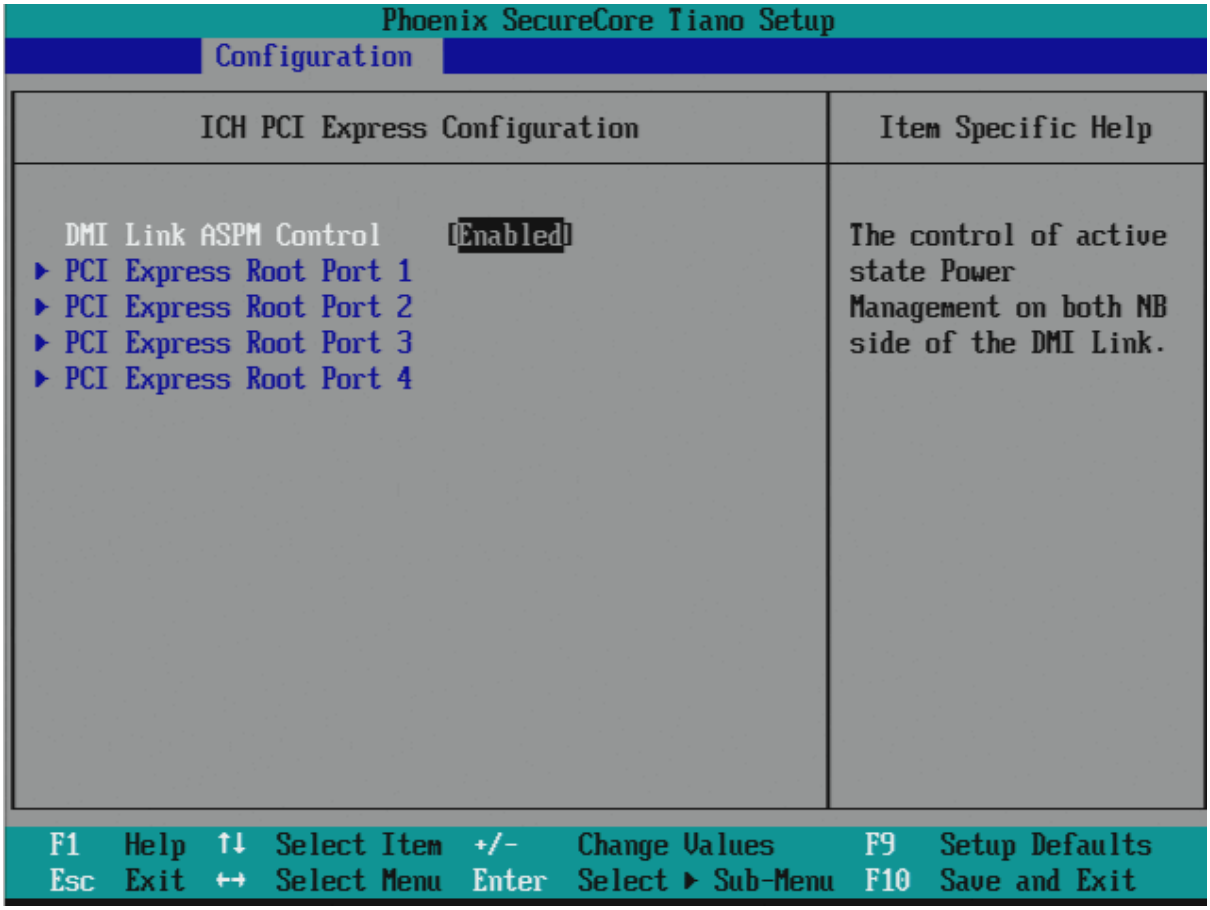
This item enables the UEFI Boot. Enable this function if you want to boot UEFI aware operation systems like Windows 7 64Bit or Linux.

The choice: Enabled, Disabled.

PCI/PCIE Configuration


Phoenix SecureCore Tiano Setup
Configuration
PCI/PCIE Configuration
PCI Device Setting
PCI Express Setting
ICH PCI Express Configuration
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

ICH PCI Express Configuration

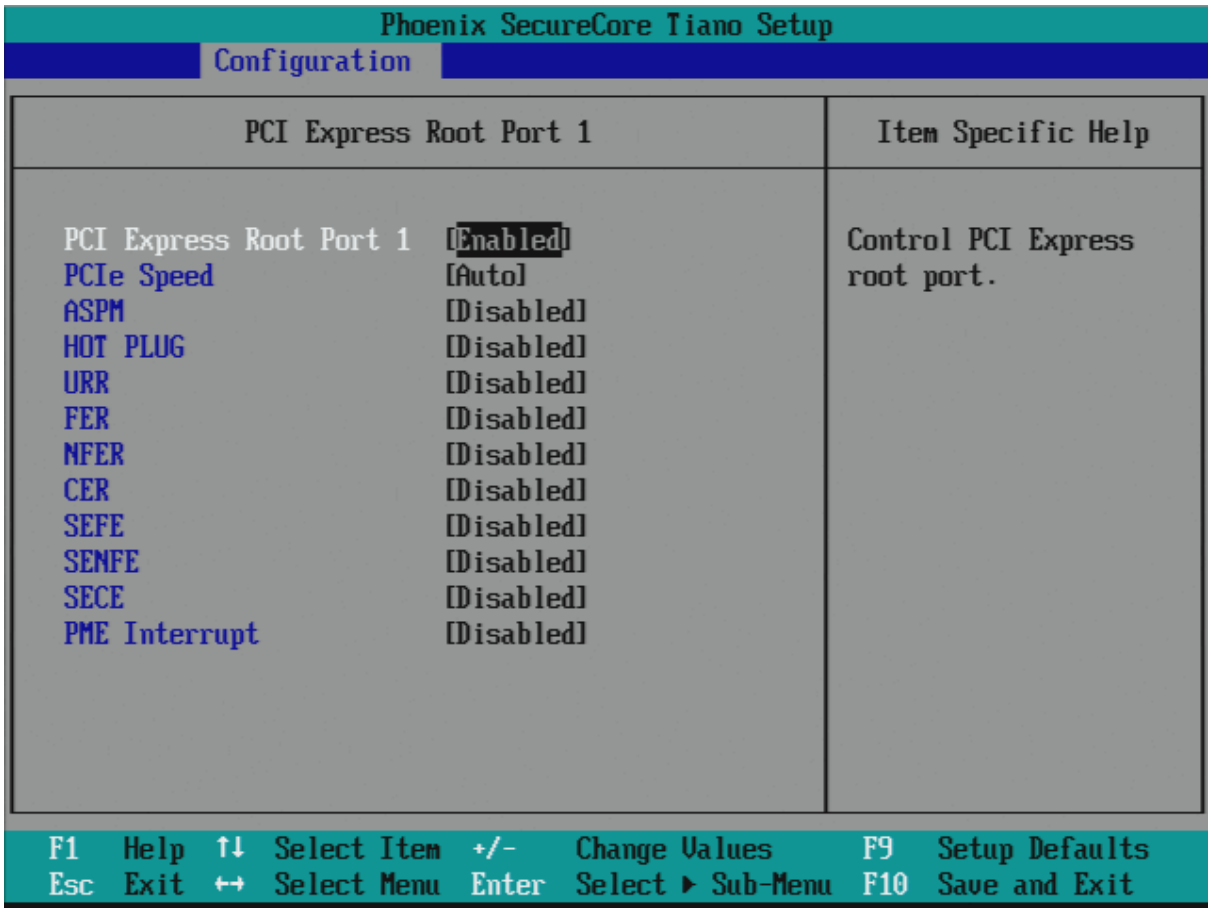

Phoenix SecureCore Tiano Setup
Configuration
ICH PCI Express Configuration
Item Specific Help
DMI Link ASPM Control [Enabled]
PCI Express Root Port 1
PCI Express Root Port 2
PCI Express Root Port 3
PCI Express Root Port 4
The control of active state Power Management on both NB side of the DMI Link.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

DMI Link ASPM Control

Allows the system skip certain tests while booting. This will decrease the time needed to boot the system.

The choice: Enabled, Disabled.

PCI Express Root Port 1/2/3/4



PCI Express Root Port 1/2/3/4

Control the PCI Express Root Port.

PCIe Speed

Select PCIe Speed to Gen1 or Gen2.

ASPM

Set the ASPM Level: Force L0 – Force all links to L0 state : AUTO – BIOS auto configure : DISABLE – Disables ASPM

HOT PLUG

Enable or disable PCI Express Hot Plug.

URR

Enable or disable PCI Express Unsupported Request Reporting.

FER

Enable or disable PCI Express Device Fatal Error Reporting.

NFER

Enable or disable PCI Express Device Non-Fatal Error Reporting.

CER

Enable or disable PCI Express Device Correctable Error Reporting.

SEFE

Enable or disable Root PCI Express System Error on Fatal Error.

SENFE

Enable or disable Root PCI Express System Error on Non-Fatal Error.

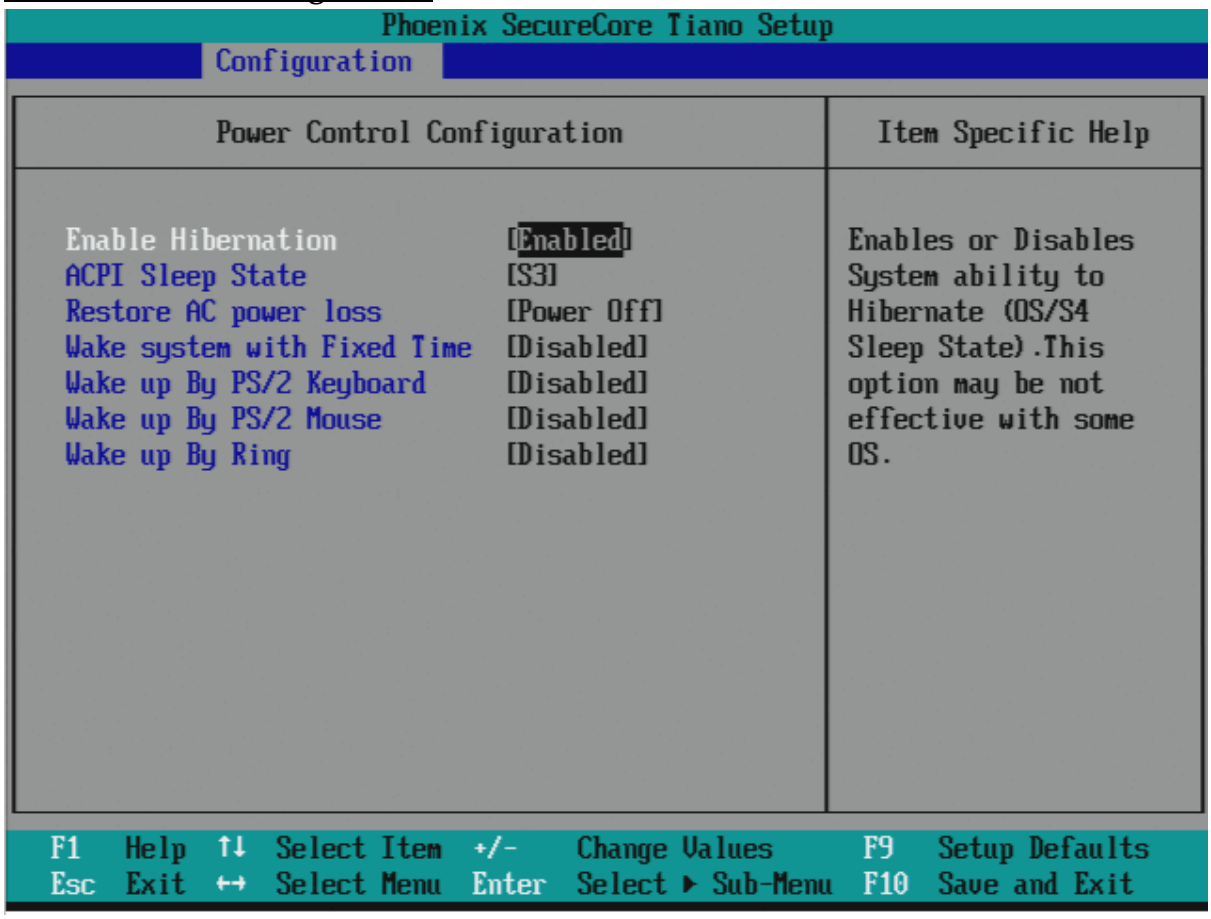
SECE

Enable or disable Root PCI Express System Error on Correctable Error.

PME Interrupt

Enable or disable PCI Express PME Interrupt.

Power Control Configuration


Phoenix SecureCore Tiano Setup
Configuration
Power Control Configuration
Item Specific Help
Enable Hibernation [Enabled]
ACPI Sleep State [S3]
Restore AC power loss [Power Off]
Wake system with Fixed Time [Disabled]
Wake up By PS/2 Keyboard [Disabled]
Wake up By PS/2 Mouse [Disabled]
Wake up By Ring [Disabled]
Enables or Disables System ability to Hibernate (OS/S4 Sleep State).This option may be not effective with some OS.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Enable Hibernation

Enables or Disable System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.

ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

The choice: Suspend Disabled, S1 (CPU Stop Clock), S3 (Suspend to RAM)

Restore AC Power Loss

Select AC power state when power is re-applied after a power failure.

Wake up By PS/2 Keyboard

Enable or disable integrated PS/2 Keyboard to wake the system.

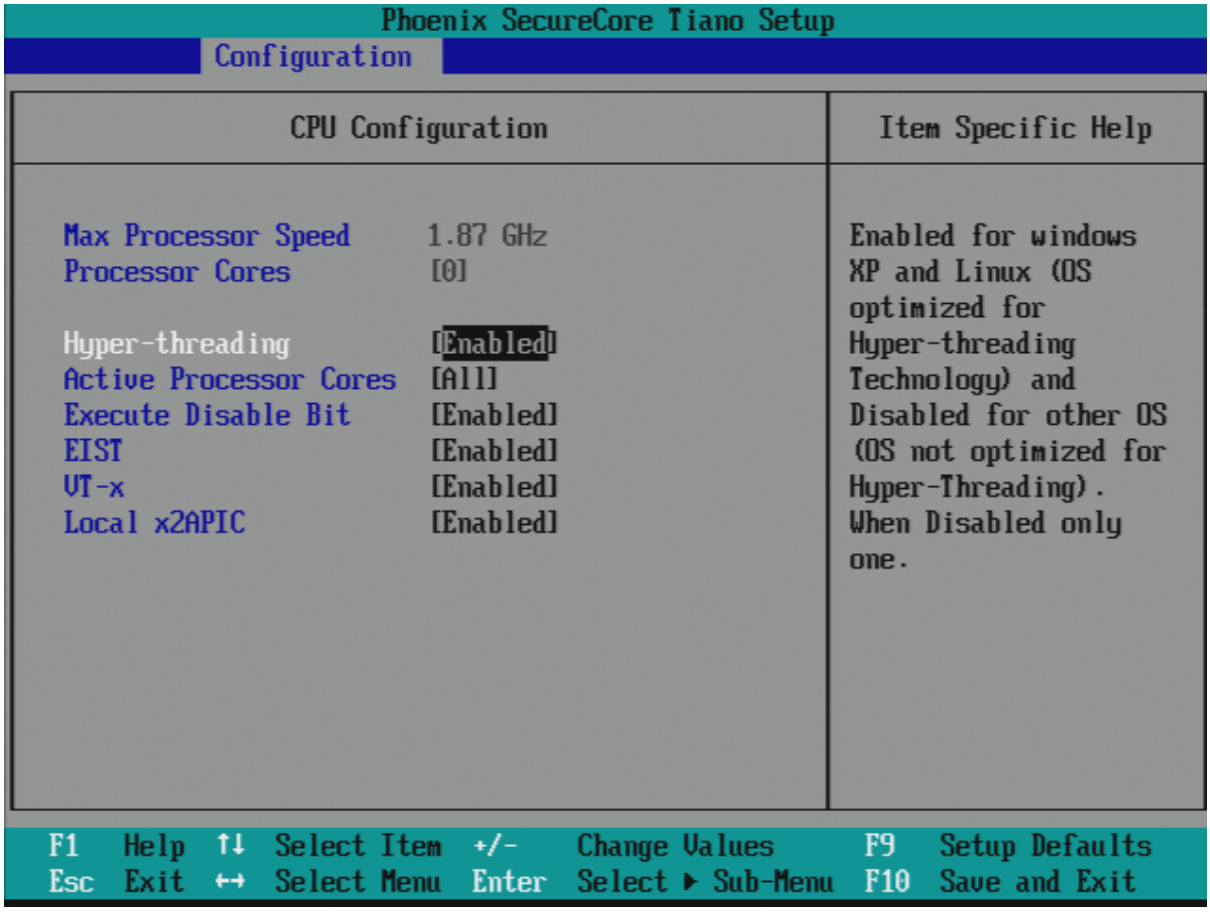
Wake up By PS/2 Mouse

Enable or disable integrated PS/2 Mouse to wake the system.

Wake up By Ring

Enable or disable Ring to wake the system.

CPU Configuration


Phoenix SecureCore Tiano Setup
Configuration
CPU Configuration
Item Specific Help
Max Processor Speed 1.87 GHz
Processor Cores [0]
Hyper-threading [Enabled]
Active Processor Cores [All]
Execute Disable Bit [Enabled]
EIST [Enabled]
VT-x [Enabled]
Local x2APIC [Enabled]
Enabled for windows XP and Linux (OS optimized for Hyper-threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading). When Disabled only one.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Hyper-threading

Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper- Threading Technology). When Disabled only one thread per enabled core is enabled.

Active Processor Cores

Number of cores to enable in each processor package.

Execute Disable Bit

XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 Sp1, Windows XP SP2, SuSE Linux 9.2 RedHat Enterprise 3 Update 3.).

EIST

Enable/Disable Intel SpeedStep

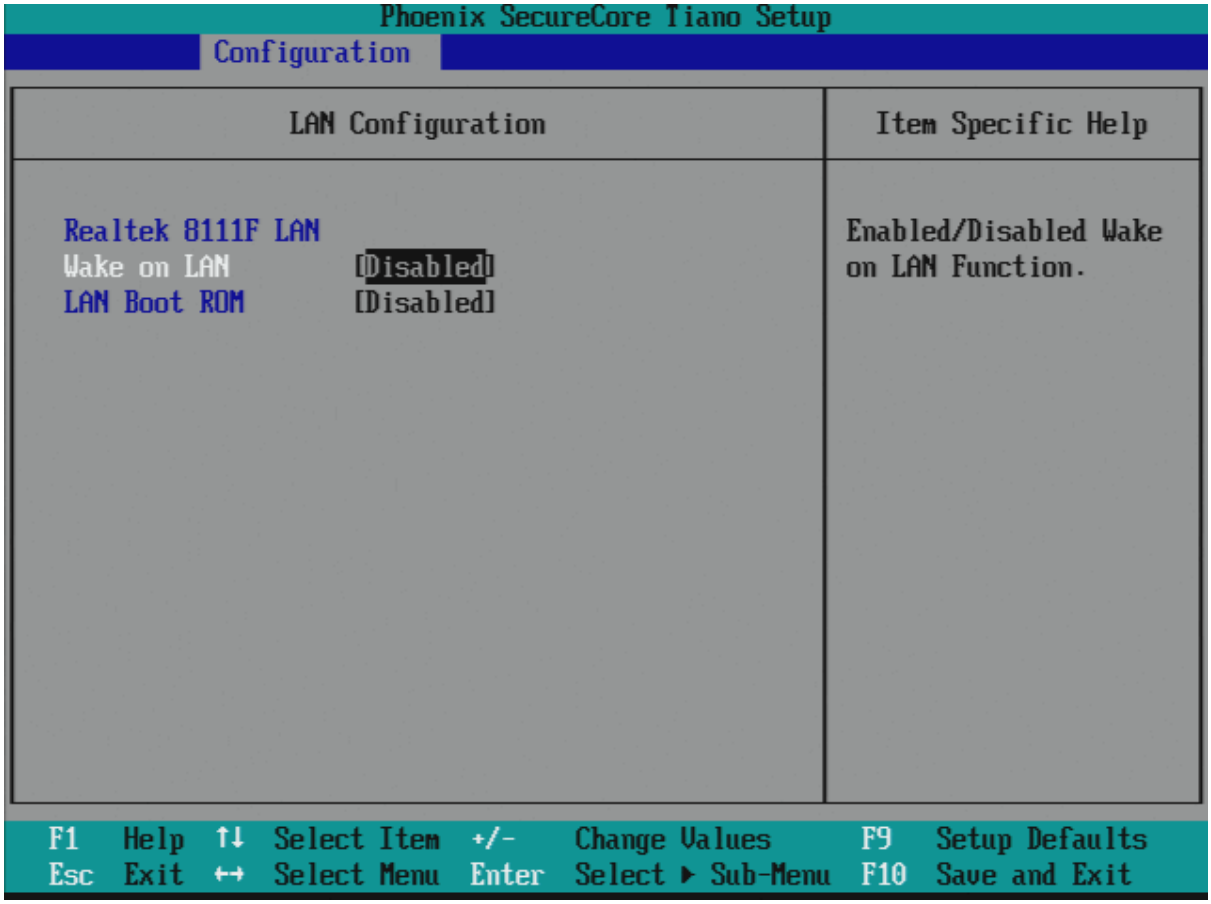
VT-x

Enable/Disable Vanderpool Technology

Local x2APIC

Enable Local x2APIC. Some 0Ses do not support this.

LAN Configuration


Phoenix SecureCore Tiano Setup
Configuration
LAN Configuration
Item Specific Help
Realtek 8111F LAN
Wake on LAN [Disabled]
LAN Boot ROM [Disabled]
Enabled/Disabled Wake on LAN Function.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

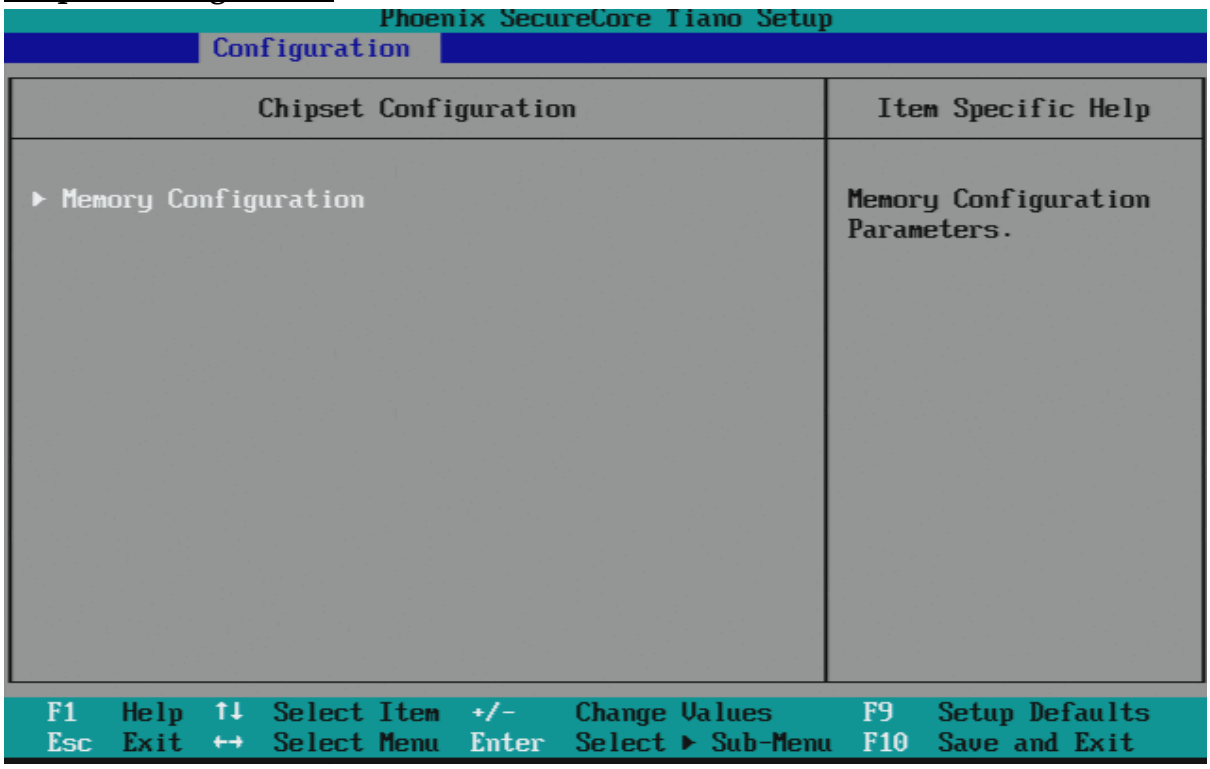
Wake on LAN

Enable or disable integrated LAN to wake the system.

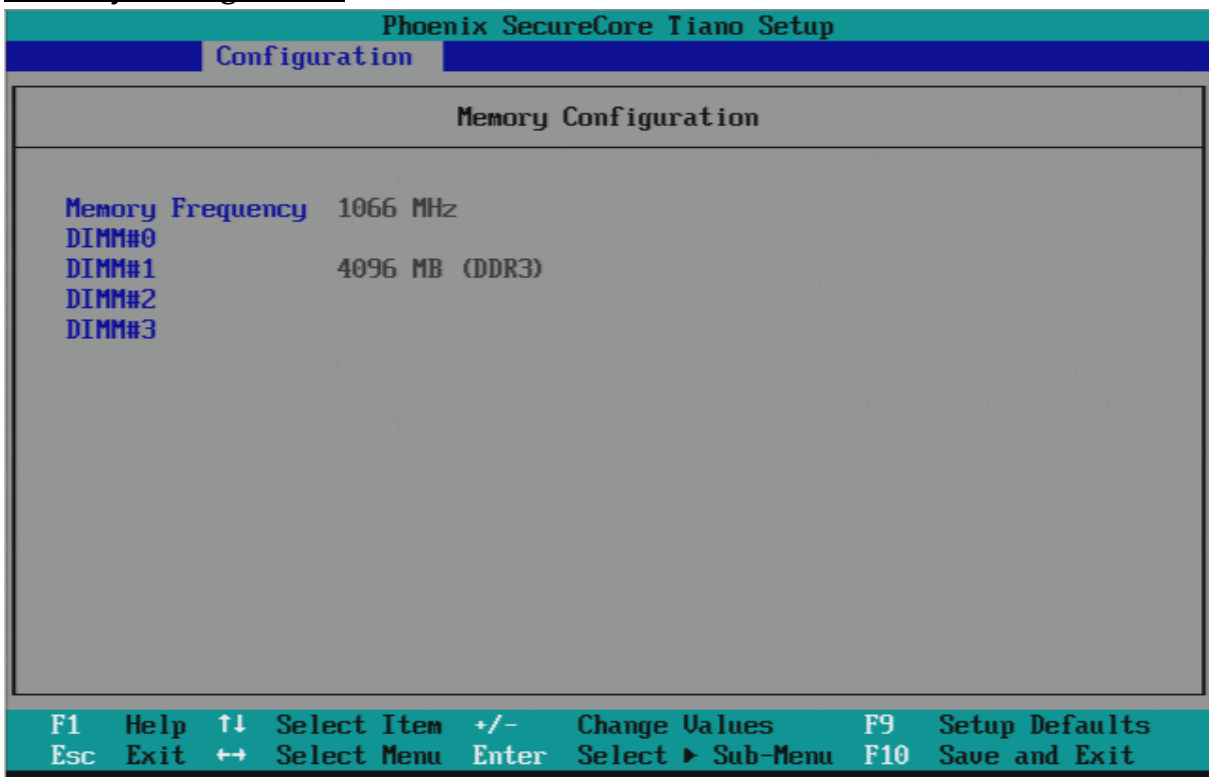
LAN Boot ROM

Enable or disable integrated LAN Boot ROM(PXE) function.

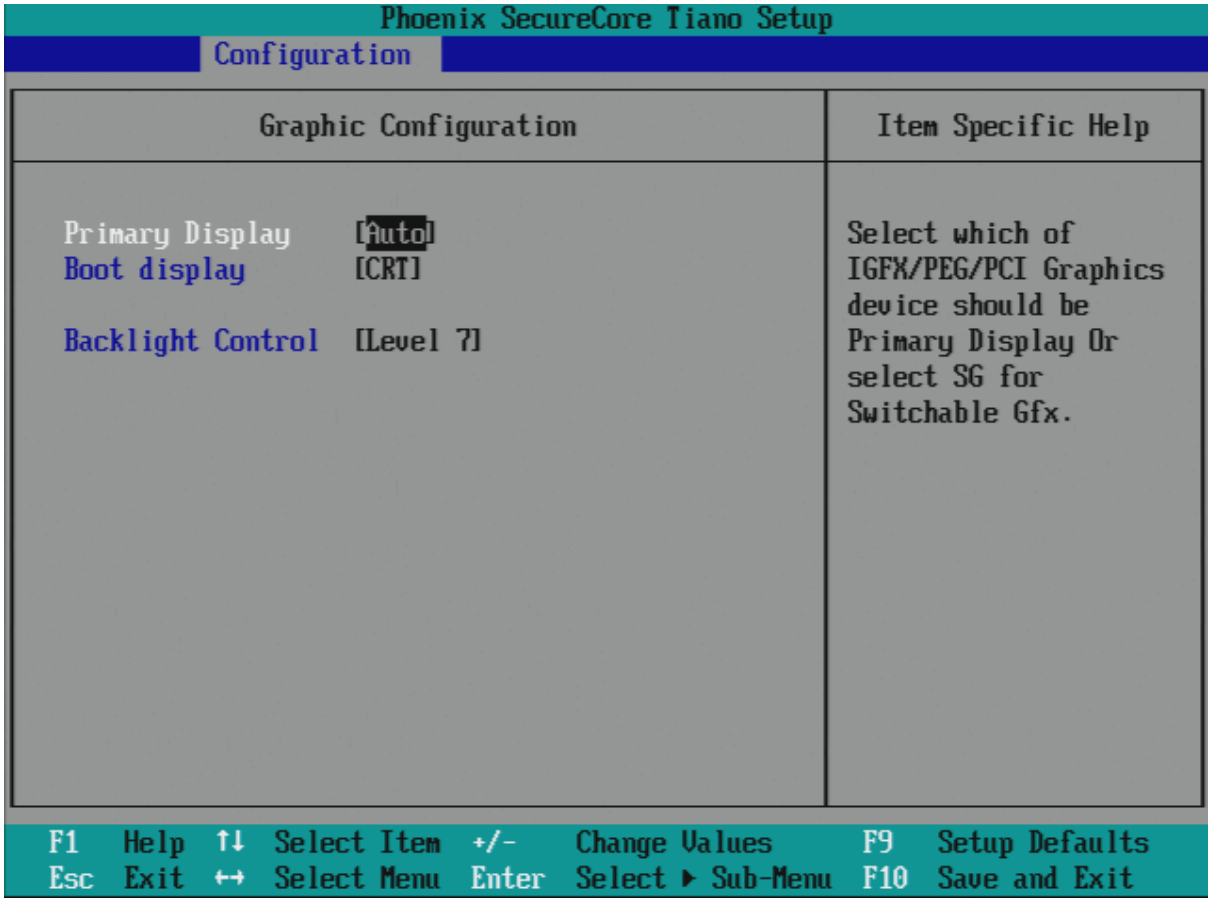
Chipset Configuration


Phoenix SecureCore Tiano Setup
Configuration
Chipset Configuration
Item Specific Help
▶ Memory Configuration
Memory Configuration Parameters.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

Memory Configuration


Phoenix SecureCore Tiano Setup
Configuration
Memory Configuration
Memory Frequency 1066 MHz
DIMM#0
DIMM#1 4096 MB (DDR3)
DIMM#2
DIMM#3
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

Graphic Configuration


Phoenix SecureCore Tiano Setup
Configuration
Graphic Configuration
Item Specific Help
Primary Display [Auto]
Boot display [CRT]
Backlight Control [Level 7]
Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Primary Display

Select which of IGFX/PEG/PCI Graphics device should be Primary Display or select SG for Switchable Gfx.
The choice: Auto, IGFX, PEG, PCI

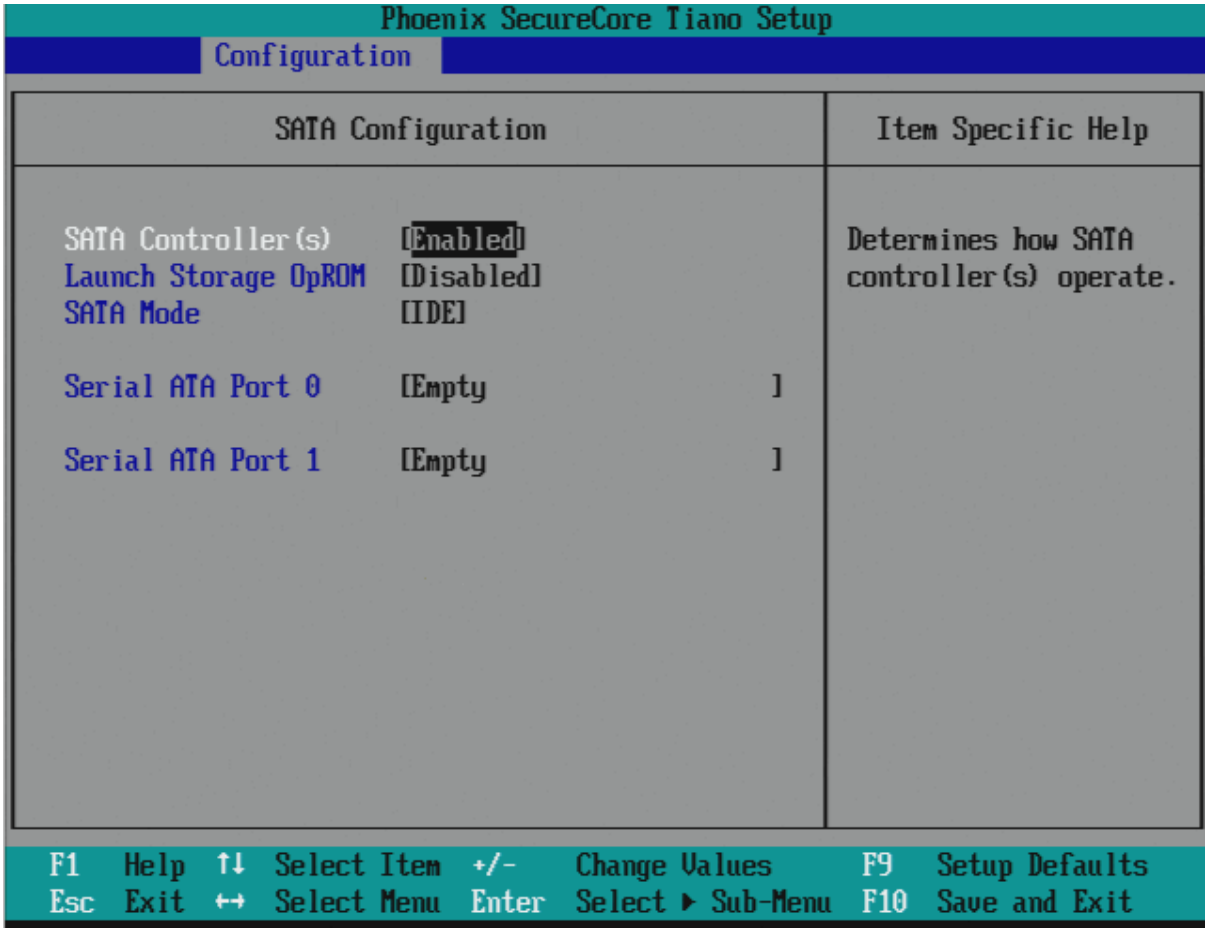
Boot Display

Select the video Device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display.
The choice: CRT, LVDS, CRT+HDMI

Backlight Control

Back Light Control Setting

SATA Configuration


Phoenix SecureCore Tiano Setup
Configuration
SATA Configuration
Item Specific Help
SATA Controller(s) [Enabled]
Launch Storage OpROM [Disabled]
SATA Mode [IDE]
Serial ATA Port 0 [Empty]
Serial ATA Port 1 [Empty]
Determines how SATA controller(s) operate.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

SATA Controller(s)

Enable or disable SATA Device.

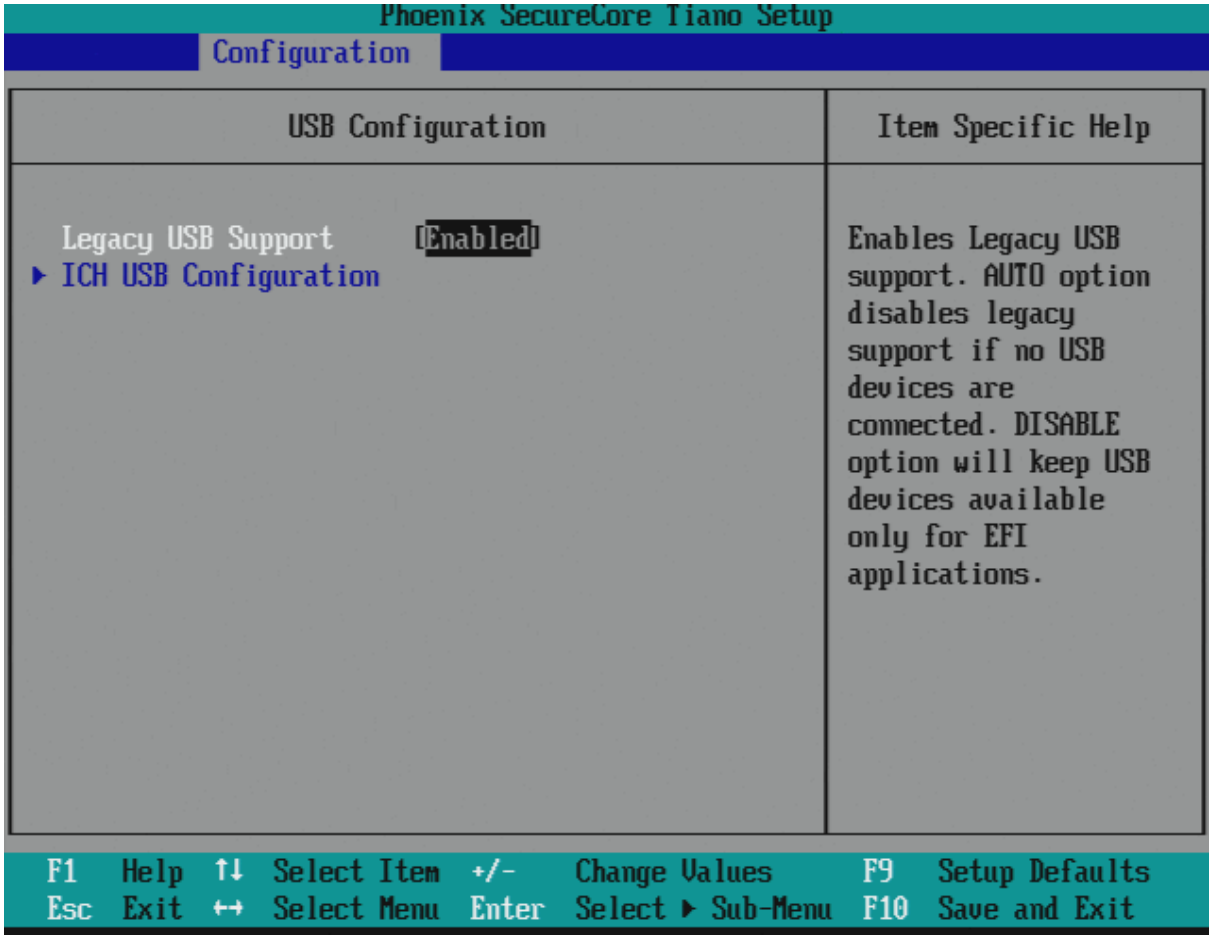
Launch Storage OpROM

Enable or disable boot option Launch Storage devices with option ROM.

SATA Mode

Determines how SATA controller(s) operate.
The choice: IDE, AHCI

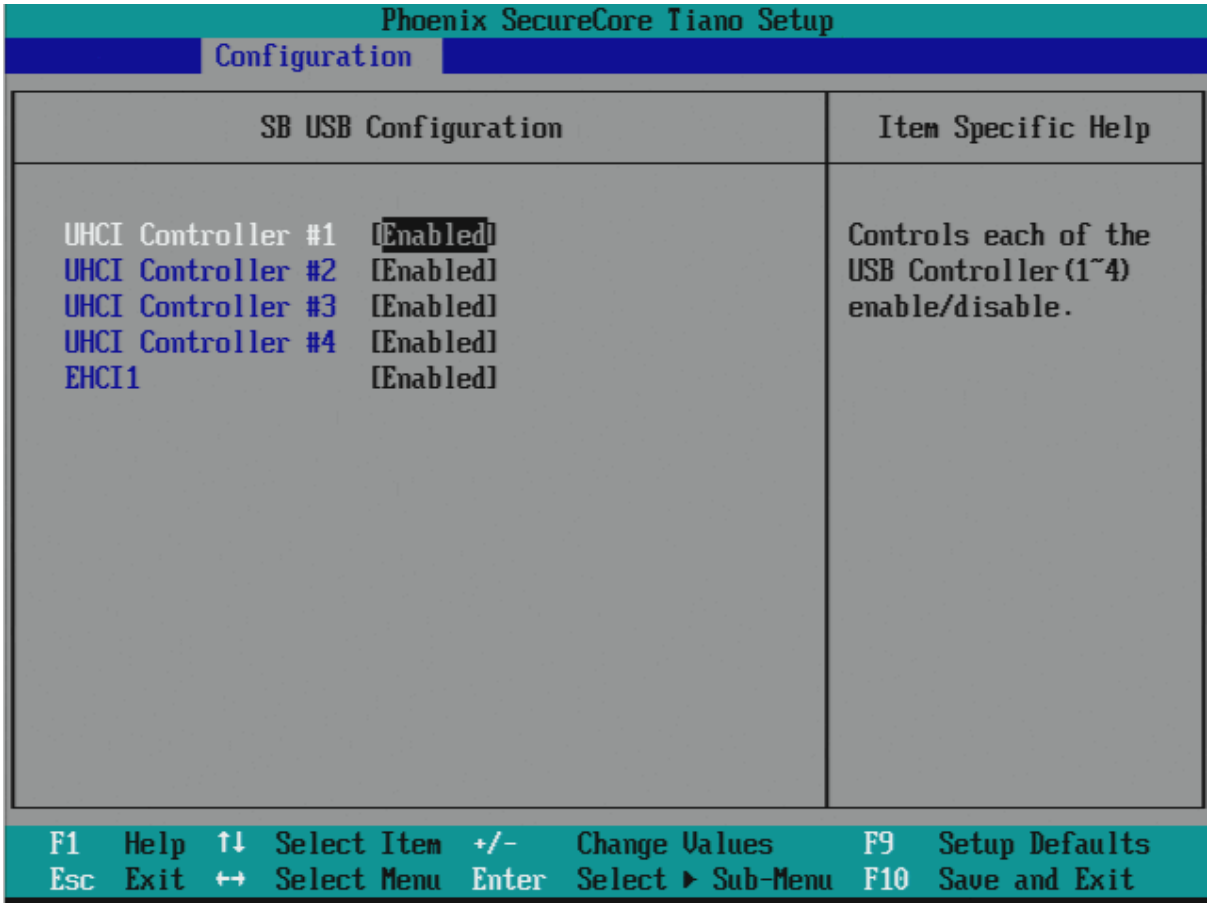
USB Configuration


Phoenix SecureCore Tiano Setup
Configuration
USB Configuration
Item Specific Help
Legacy USB Support [Enabled]
ICH USB Configuration
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Legacy USB Support

Enable Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications

SB USB Configuration


Phoenix SecureCore Tiano Setup
Configuration
SB USB Configuration
Item Specific Help
UHCI Controller #1 [Enabled]
UHCI Controller #2 [Enabled]
UHCI Controller #3 [Enabled]
UHCI Controller #4 [Enabled]
EHCI1 [Enabled]
Controls each of the USB Controller(1~4) enable/disable.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

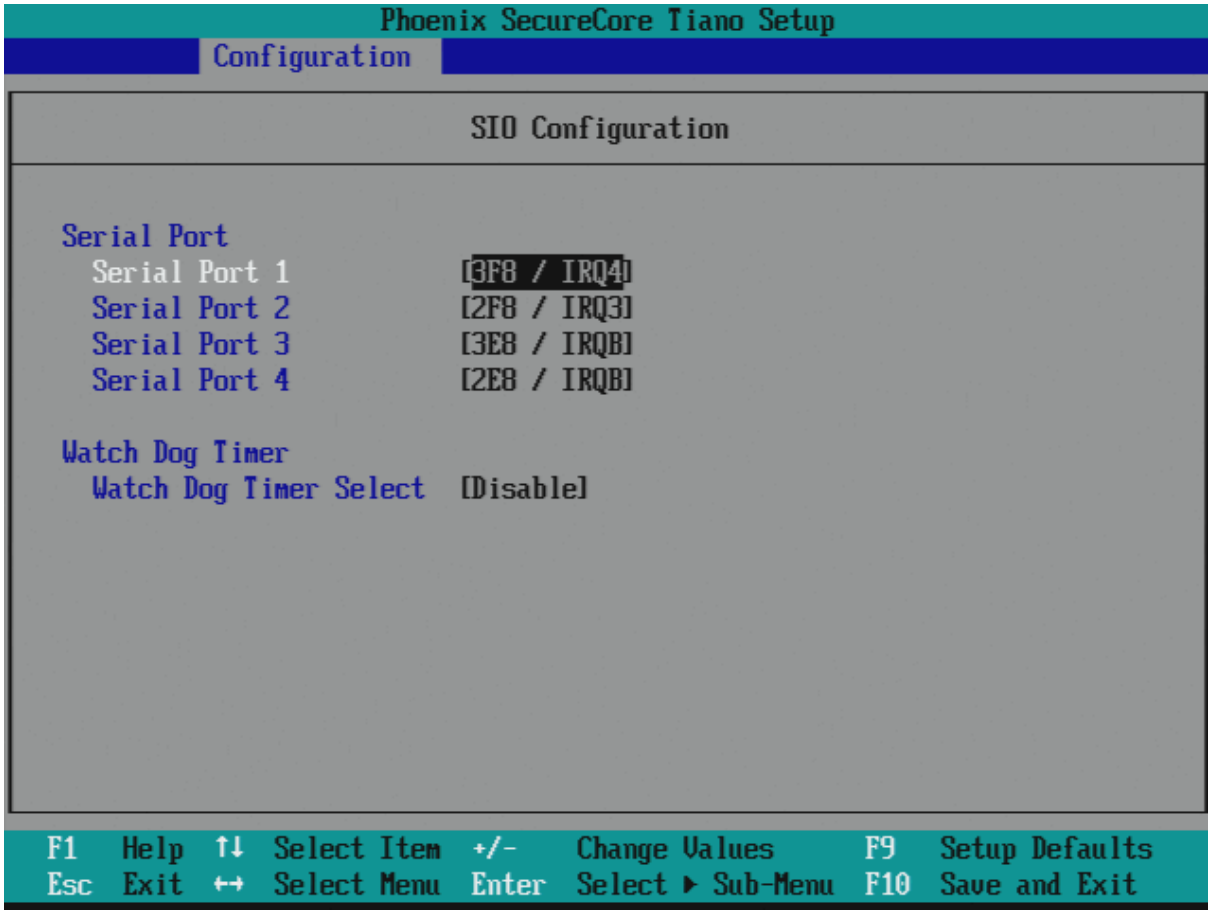
UHCI Controller #1/2/3/4

Contrils each of the USB Cantroller(1~4).
The choice: IDE, AHCI, RAID

EHCI 1

Control the USB EHCI (USB 2.0) functions.
One EHCI controller must always be enabled.

SIO Configuration


Phoenix SecureCore Tiano Setup
Configuration
SIO Configuration
Serial Port
Serial Port 1 [3F8 / IRQ4]
Serial Port 2 [2F8 / IRQ3]
Serial Port 3 [3E8 / IRQB]
Serial Port 4 [2E8 / IRQB]
Watch Dog Timer
Watch Dog Timer Select [Disable]
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Serial Port 1/2

Select an optimal setting for Super IO device
The choice: 3F8/IRQ4, 2F8/IRQ3

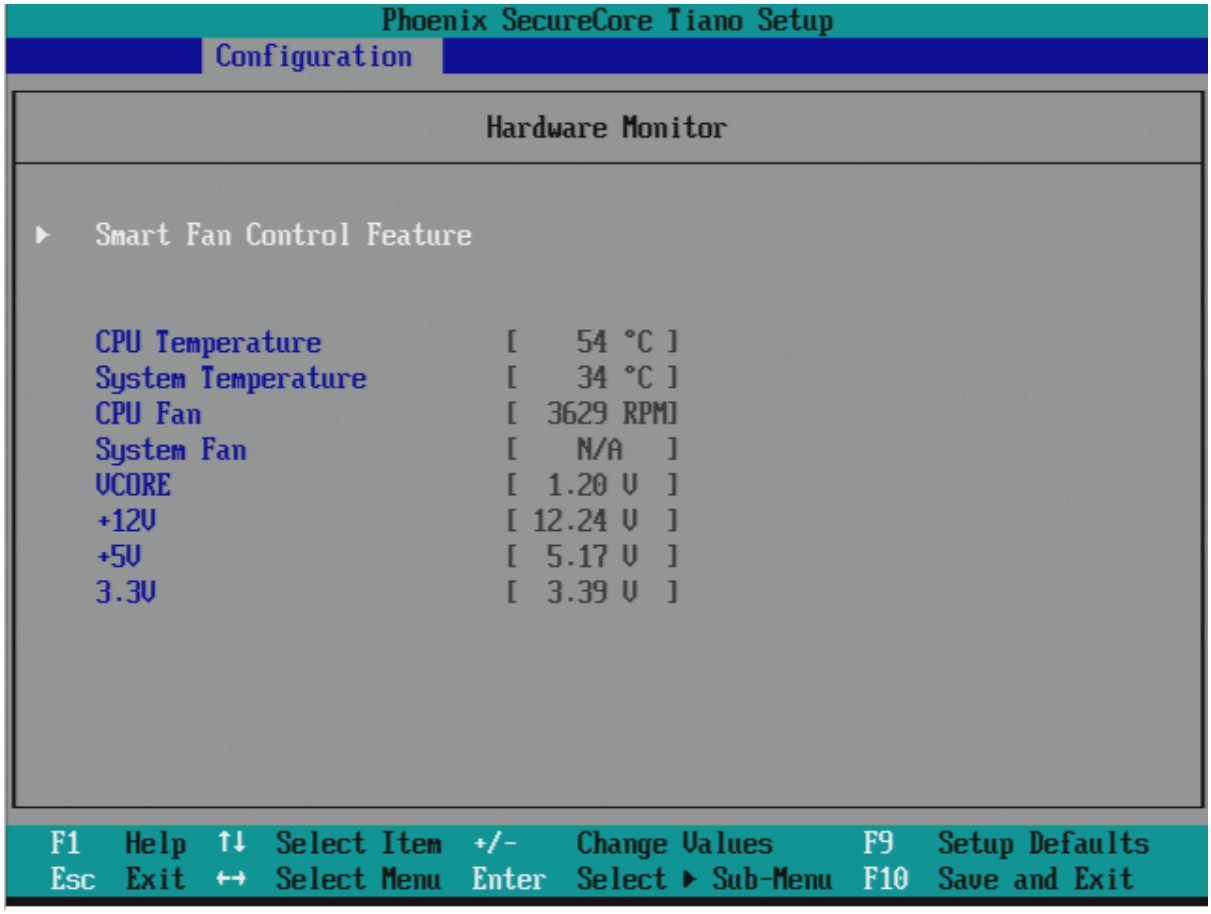
Serial Port 3/4

Select an optimal setting for Super IO device
The choice: 3E8/IRQB, 2E8/IRQB, 4F8/IRQB, 4E8/IRQB

Watch Dog Timer

Watch Dog Timer settings.

Hardware Monitor


Phoenix SecureCore Tiano Setup
Configuration
Hardware Monitor
Smart Fan Control Feature
CPU Temperature [54 °C]
System Temperature [34 °C]
CPU Fan [3629 RPM]
System Fan [N/A]
VCORE [1.20 V]
+12V [12.24 V]
+5V [5.17 V]
3.3V [3.39 V]
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

Smart Fan Control Feature

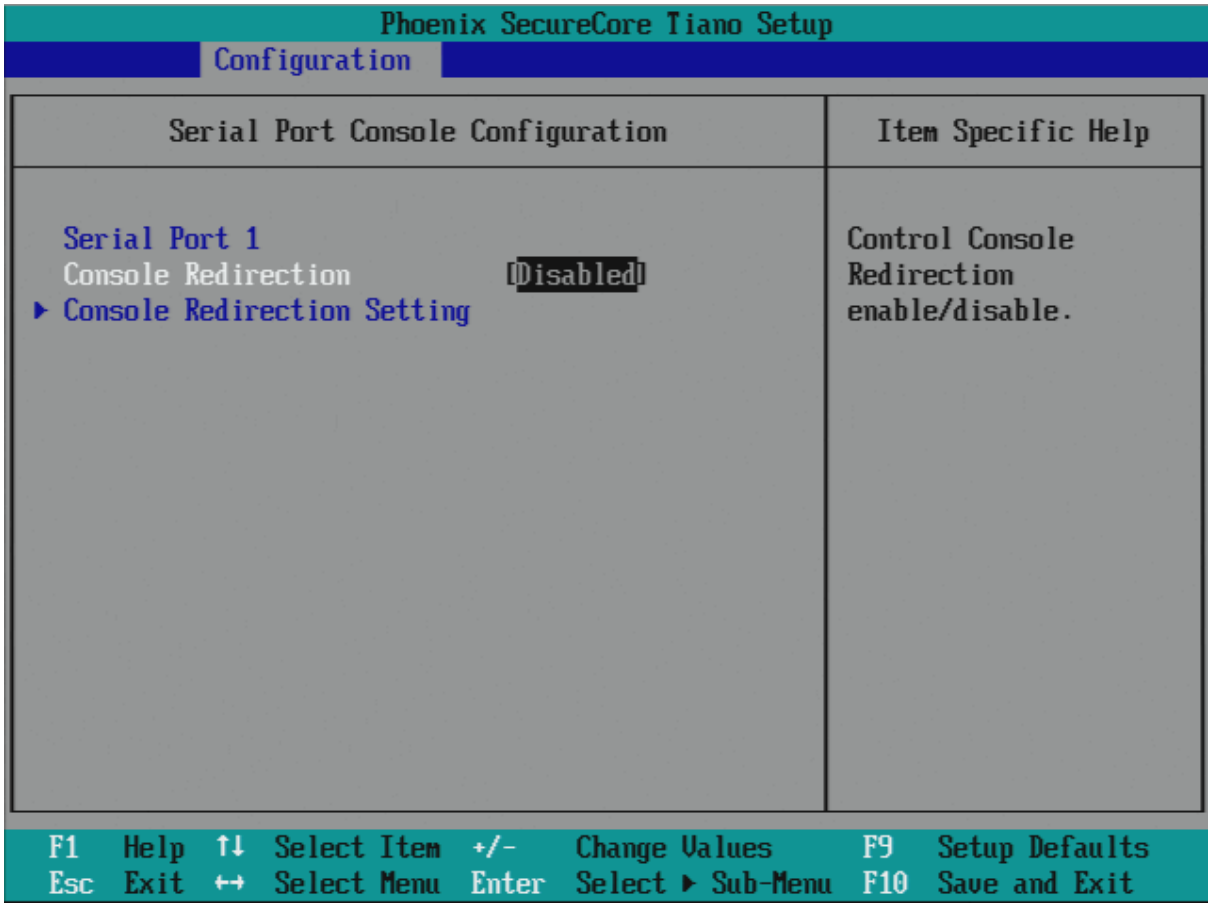
CPU/System Fan Control

Smart CPU/System Fan Function.
Choices: Full Speed, By Temperature.

CPU/System Target Temp

Smart CPU/System Fan Temperature Setting.
Choices: 40, 50, 60, 70, 80, 90.

Serial Port Console Configuration


Phoenix SecureCore Tiano Setup
Configuration
Serial Port Console Configuration
Item Specific Help
Serial Port 1
Console Redirection [Disabled]
Console Redirection Setting
Control Console Redirection enable/disable.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

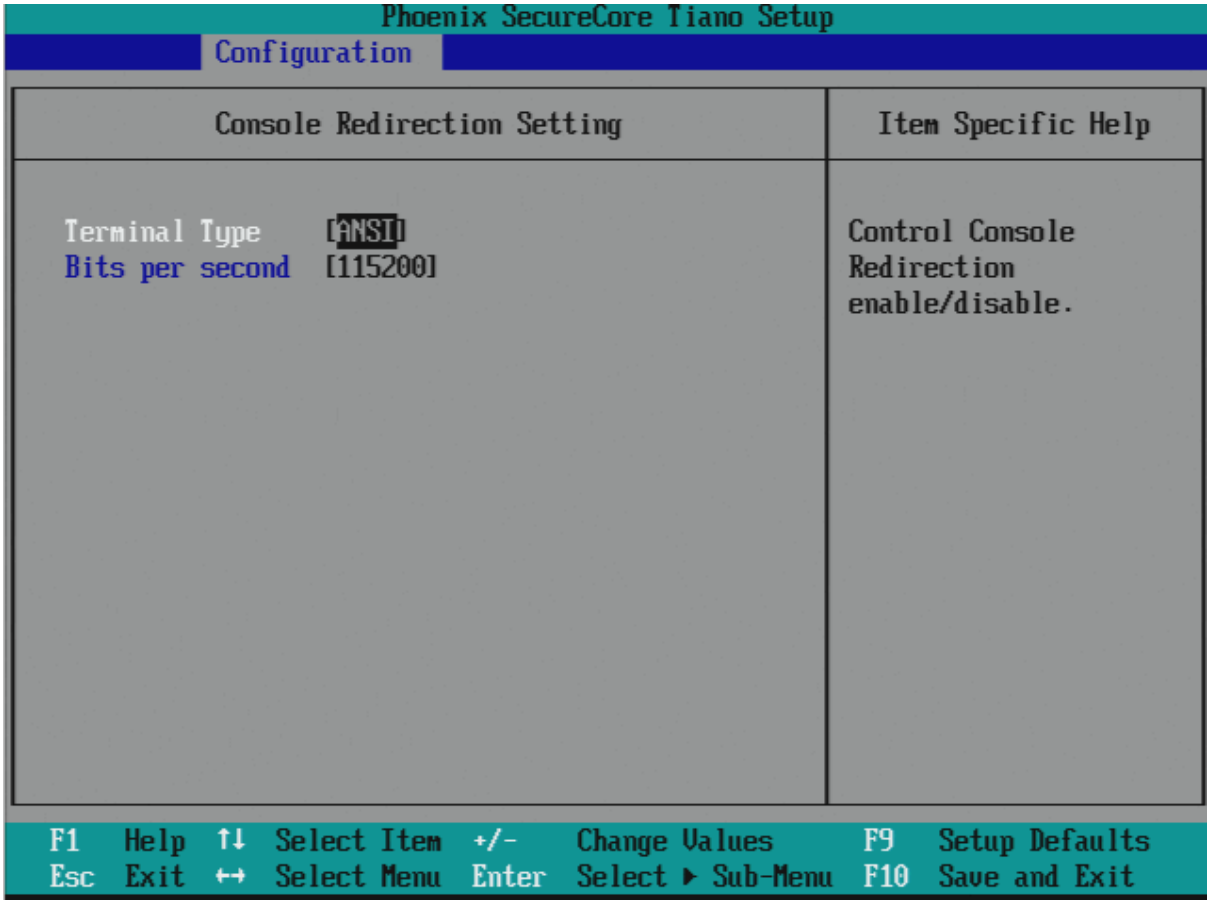
Console Redirection

Console Redirection Enable or Disable

CPU /System Tolerance Temp

Smart CPU/System Fan Temperature Setting.
Choices: 1, 2, 3, 5..

Console Redirection Setting


Phoenix SecureCore Tiano Setup
Configuration
Console Redirection Setting
Item Specific Help
Terminal Type [ANSI]
Bits per second [115200]
Control Console Redirection enable/disable.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

Terminal Type

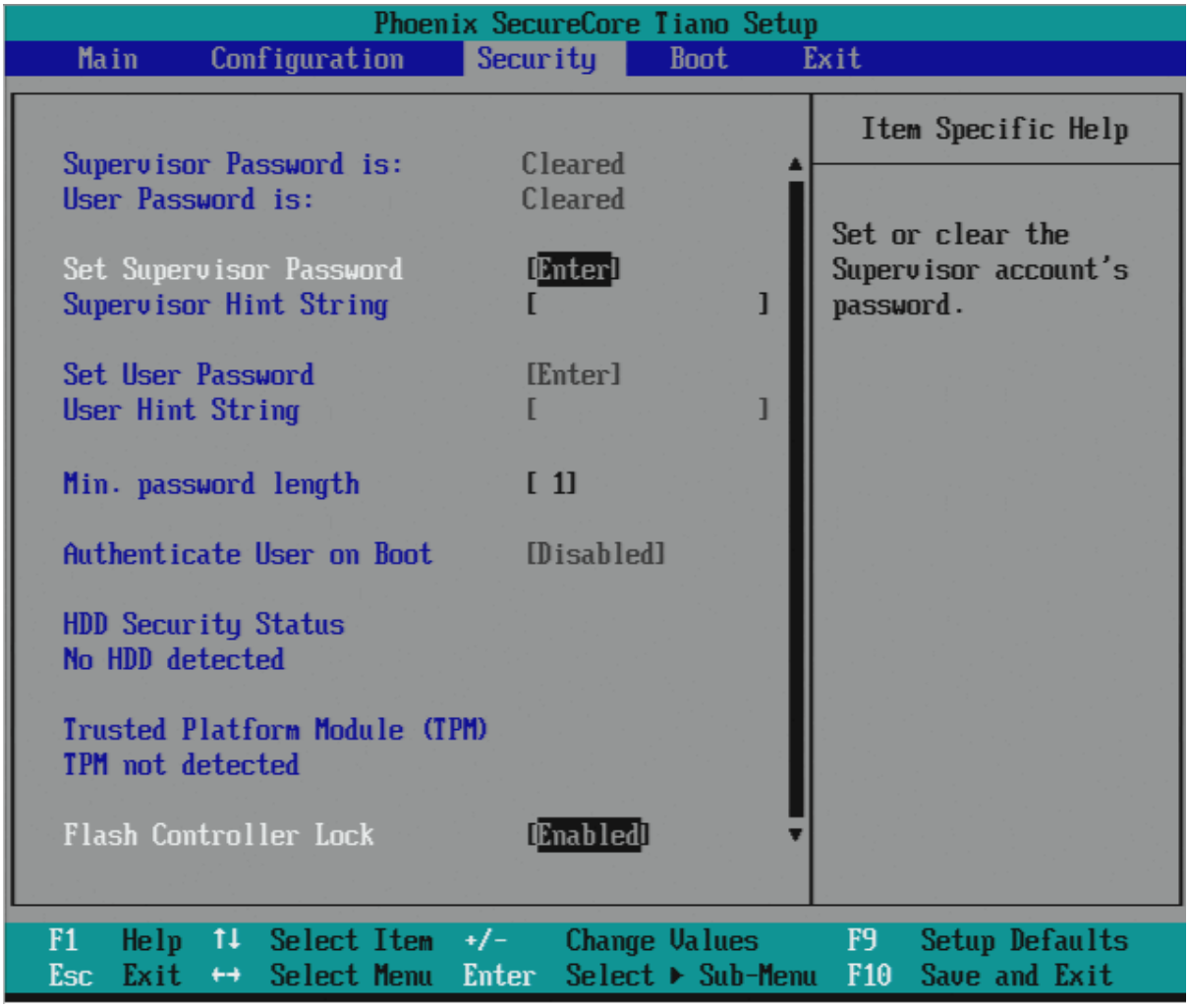
VT-UTF8 is the preferred terminal type for out-of-band management. The next best choice is VT100+ and then VT100. See above, in console Redirection Settings page, for more Help with Terminal Type/Emulation.
The choice: VT100, VT100+, VT-UTF8, ANSI

Bits Per second

Select serial port transmission speed
The choice: 9600, 19200, 57600, 115200.

4.4 Security

This section lets you set security passwords to control access to the system at boot time and/or when entering the BIOS setup program. Some systems have a single password, while many newer ones now have two: a supervisor and a user password.


Phoenix SecureCore Tiano Setup
Main
Configuration
Security
Boot
Exit
Item Specific Help
Supervisor Password is: Cleared
User Password is: Cleared
Set Supervisor Password [Enter]
Supervisor Hint String [ ]
Set User Password [Enter]
User Hint String [ ]
Min. password length [1]
Authenticate User on Boot [Disabled]
HDD Security Status
No HDD detected
Trusted Platform Module (TPM)
TPM not detected
Flash Controller Lock [Enabled]
Set or clear the Supervisor account's password.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Set Supervisor/User Password

Set or Clear Supervisor Password

Supervisor/User Hint String

Enter to type Supervisor/User Hint String

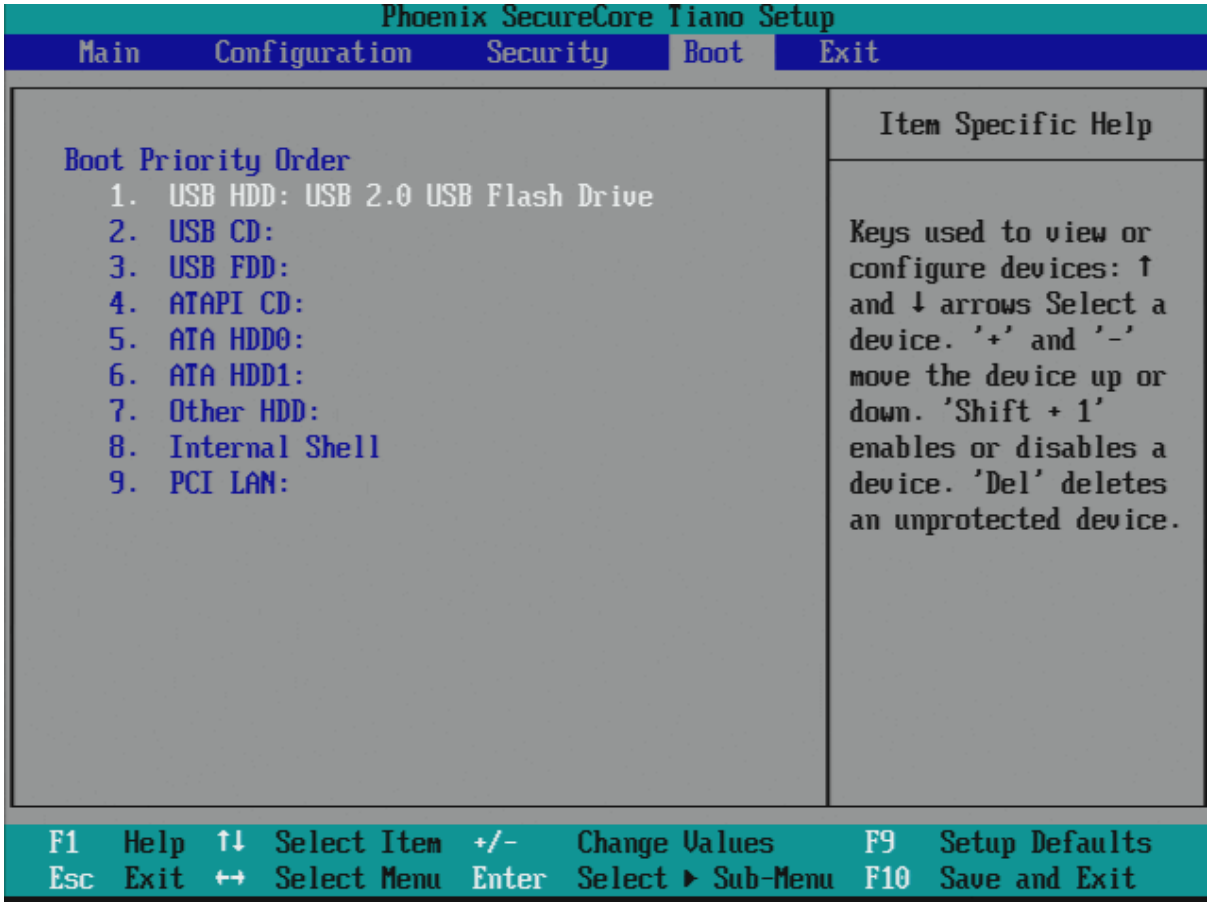
Flash Controller Lock

Lock all flash controllers

The choice: Enabled, Disabled.

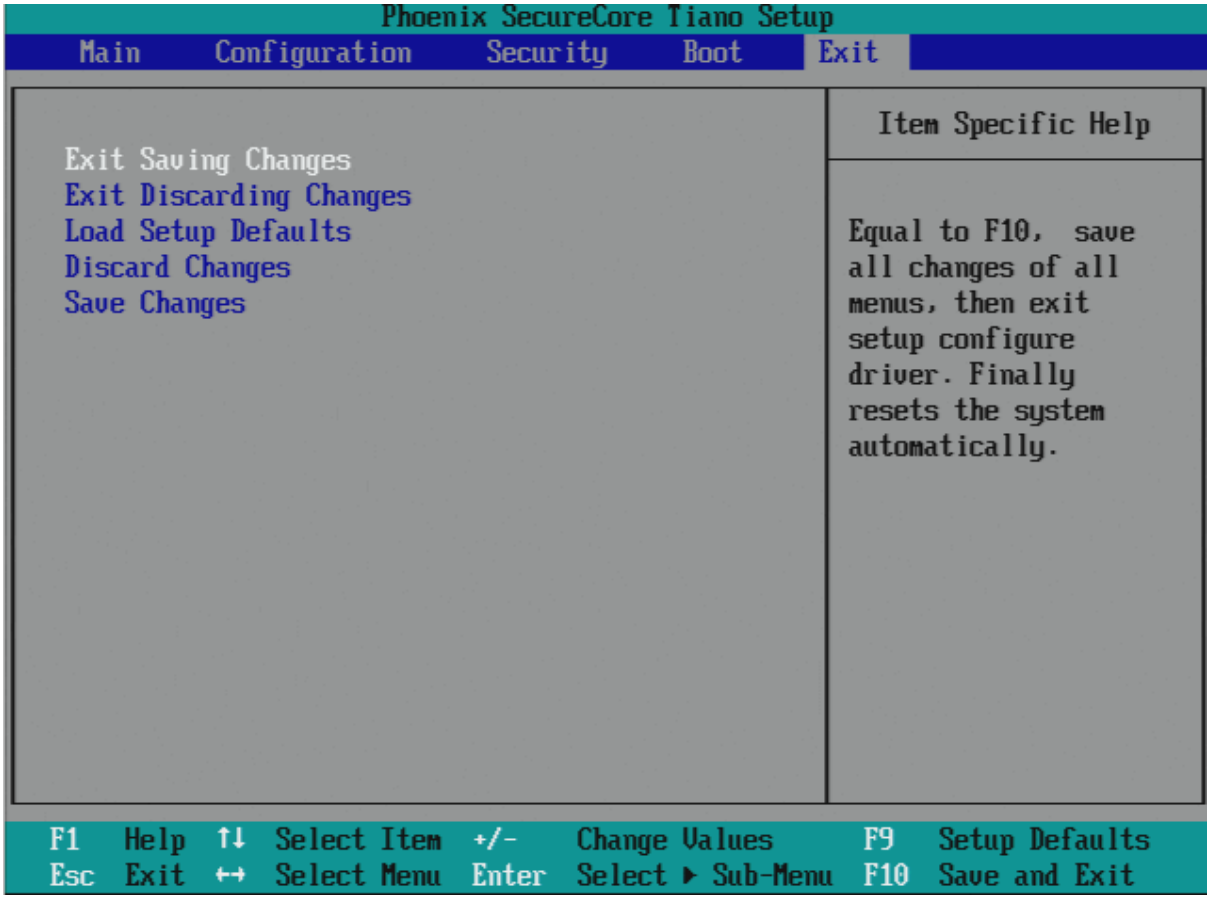
4.5 Boot

Use this menu to specify the priority of boot devices.


Phoenix SecureCore Tiano Setup
Main
Configuration
Security
Boot
Exit
Item Specific Help
Boot Priority Order
1. USB HDD: USB 2.0 USB Flash Drive
2. USB CD:
3. USB FDD:
4. ATAPI CD:
5. ATA HDD0:
6. ATA HDD1:
7. Other HDD:
8. Internal Shell
9. PCI LAN:
Keys used to view or configure devices: ↑ and ↓ arrows Select a device. '+' and '-' move the device up or down. 'Shift + 1' enables or disables a device. 'Del' deletes an unprotected device.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

4.6 Security

This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.


Phoenix SecureCore Tiano Setup
Main
Configuration
Security
Boot
Exit
Exit Saving Changes
Exit Discarding Changes
Load Setup Defaults
Discard Changes
Save Changes
Item Specific Help
Equal to F10, save all changes of all menus, then exit setup configure driver. Finally resets the system automatically.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ↔ Select Menu Enter Select ▸ Sub-Menu F10 Save and Exit

Exit Saving Changes

Exit system setup after saving the changes.

Exit Discarding Changes

Exit system setup without saving the changes.

Load Setup Defaults

Restore the User Defaults to all the setup options.

Discard Changes

Discard Changes done so far to any of the setup options.

Save Changes

Save Changes done so far to any of the setup options.

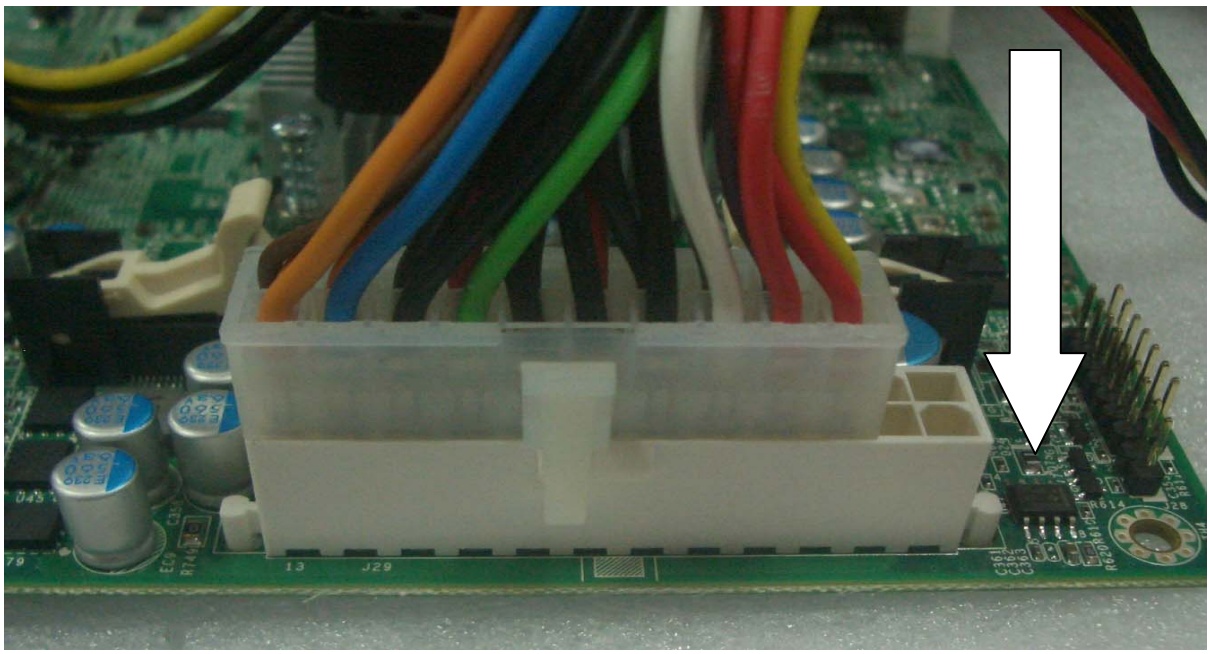
Chapter 5
Troubleshooting

This chapter provides a few useful tips to quickly get WADE-8077 running with success. As basic hardware installation has been addressed in Chapter 2, this chapter will primarily focus on system integration issues, in terms of BIOS setting, and OS diagnostics.

5.1 Hardware Quick Installation

ATX Power Setting

Unlike other Single board computer, WADE-8077 supports ATX only. Therefore, there is no other setting that really needs to be set up. However, there are only two connectors that must be connected—J29 (24 pins ATX Power Connector) Figure.



It is assumed that users have correctly adopted modules and connected all the devices cables required before turning on ATX power. CPU, CPU Fan, 204-pin DDR3 SDRAM, keyboard, mouse, SATA hard disk, VGA connector, device power cables, ATX accessories are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To make sure that you have a successful start with WADE-8077, it is recommended, when going with the boot-up sequence, to hit "DEL" key and enter the BIOS setup menu to tune up a stable BIOS configuration so that you can wake up your system far well.

Loading the default optimal setting

When prompted with the main setup menu, please scroll down to **"Load Setup Defaults"**, press "Enter" and "Y" to load in default optimal BIOS setup. This will force your BIOS setting back to the initial factory configuration. It is recommended to do this so you can be sure the system is running with the BIOS setting that Portwell has highly endorsed. As a matter of fact, users can load the default BIOS setting any time when system appears to be unstable in boot up sequence.

5.2 FAQ

Symptom: SBC keeps beeping, and no screen has shown.

Solution: In fact, each beep sound represents different definition of error message. Please refer to table as following:

Beep sounds	Meaning	Action
One long beep with one short beeps	DRAM error	Change DRAM or reinstall it
One long beep constantly	DRAM error	Change DRAM or reinstall it
One long beep with two short beeps	Monitor or Display Card error	Please check Monitor connector whether it inserts properly
Beep rapidly	Power error warning	Please check Power mode setting

Question: I forget my password of system BIOS, what am I supposed to do?

Answer: You can simply short 2-3 pins on J22 to clean your password.

Note:
Please visit our technical web site at
http://www.portwell.com.tw
For additional technical information, which is not covered in this manual, you can mail to tsd@portwell.com.tw or you can also send mail to our sales, they wull be very delighted to forward them to us.

System Memory Address Map

Each On-board device in the system is assigned a set of memory addresses, which also can be identical of the device. The following table lists the system memory address used for your reference.

System Memory Address Map		
Memory Area	**Size**	**Description**
0000-003F	1K	Interrupt Area
0040-004F	0.3K	BIOS Data Area
0050-006F	0.5K	System Data
0070-0E2E	54K	DOS
0E2F-0F6B	5K	Program Area
9F6C-9FBF	577K	【Available】
First Meg	**-- Conventional memory end at 639K --**	
9FC0-9FFF	1K	Extended BIOS Area
A000-AFFF	64K	VGA Graphics
B000-B7FF	32K	Unused
B800-BFFF	32K	VGA Text
C000-CF3F	61K	Video ROM
CF40-EFFF	131K	Unused
F000-FFFF	64K	System ROM
HMA	64K	First 64K Extended

Interrupt Request Lines (IRQ)

Peripheral devices can use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Interrupt Request Lines IRQ		
IRQ#	Current Use	Default Use
IRQ 0	System ROM	System Timer
IRQ 1	System ROM	Keyboard Event
IRQ 2	【Unassigned】	Usable IRQ
IRQ 3	System ROM	COM2
IRQ 4	System ROM	COM1
IRQ 5	【Unassigned】	Usable IRQ
IRQ 6	System ROM	Diskette Event
IRQ 7	Unused	Usable IRQ
IRQ 8	System ROM	Real-Time Clock
IRQ 9	【Unassigned】	Usable IRQ
IRQ 10	【Unassigned】	Usable IRQ
IRQ 11	【Unassigned】	Usable IRQ
IRQ 12	System ROM	IBM Mouse Event
IRQ 13	System ROM	Coprocessor Error
IRQ 14	System ROM	Hard Disk Event
IRQ 15	【Unassigned】	Usable IRQ